JULY 31, 1961

PAPER TRADE JOURNAL

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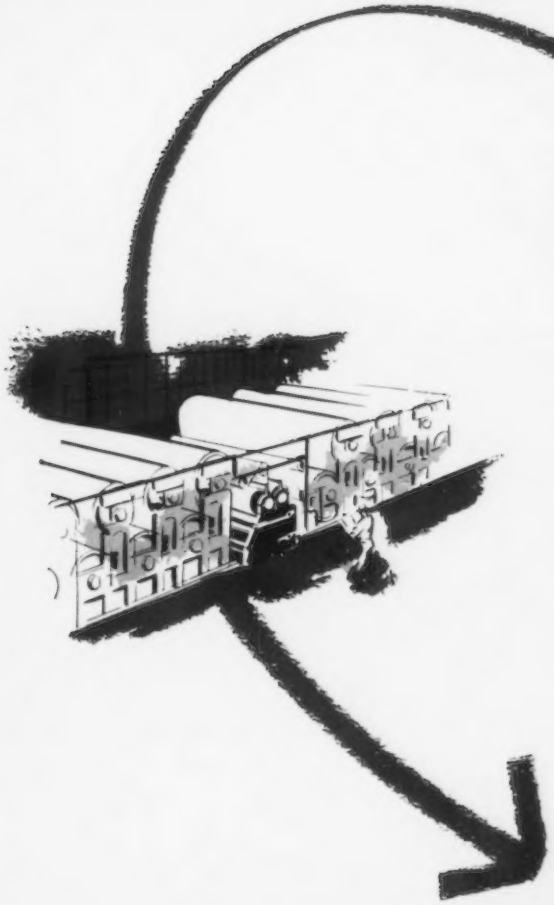

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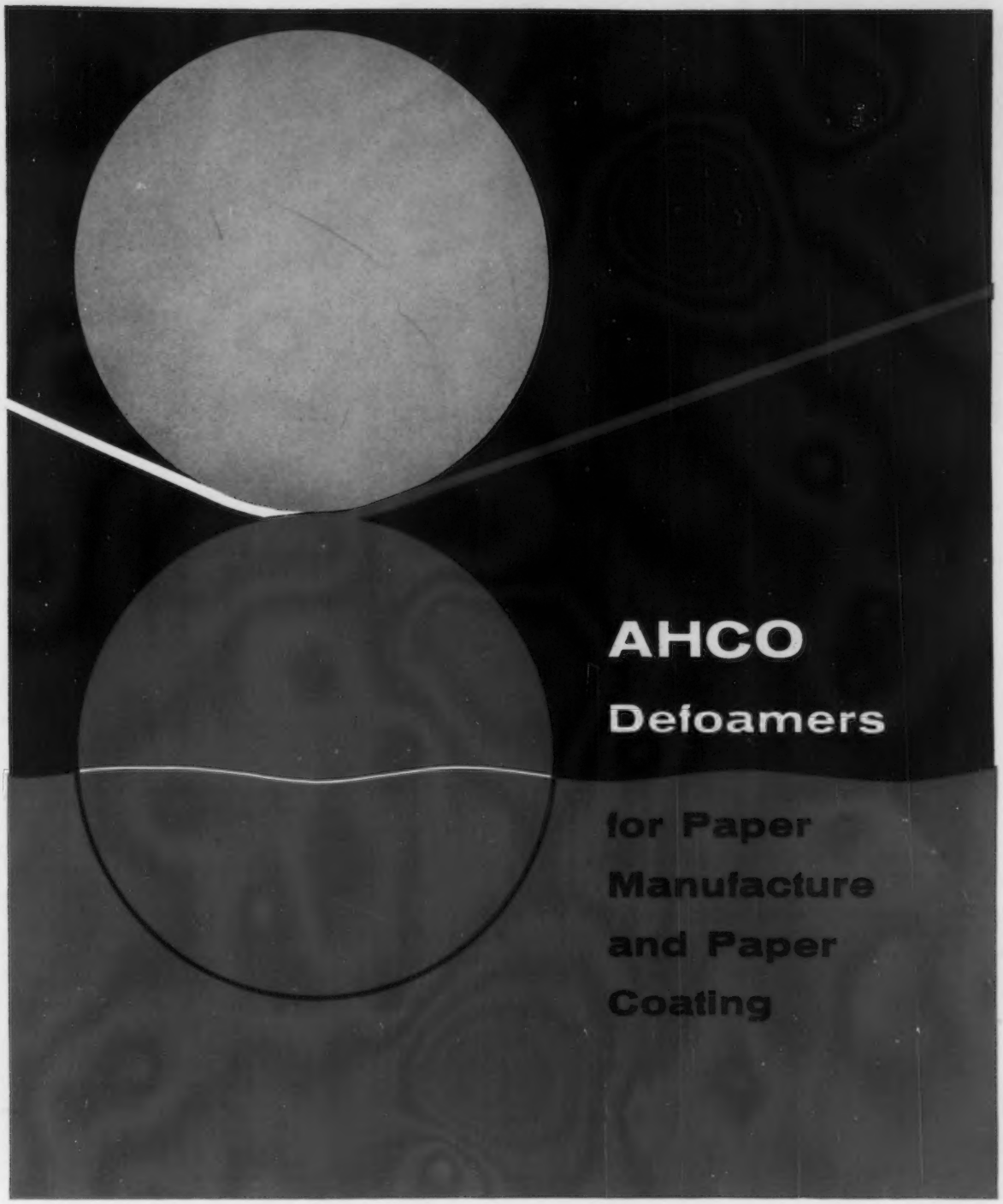

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How a Large Southern Mill Combats the Insect Problem

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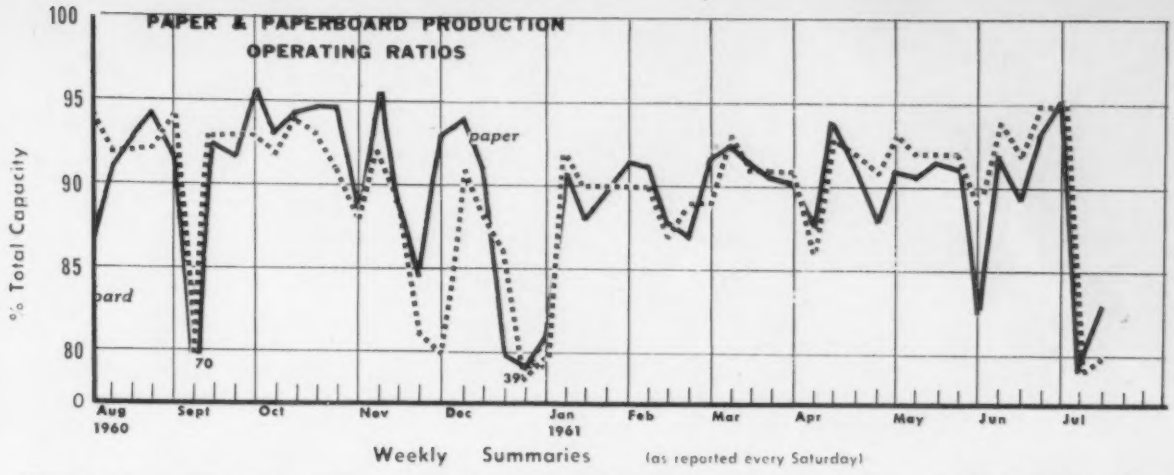

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REMEMBER THESE DATES

TAPPI Lignin Symposium, Edgewater Beach Hotel, Chicago, Ill. — **AUGUST 14-16**

TAPPI Corrugated Containers Conference, St. Francis Hotel, San Francisco, Calif. — **SEPTEMBER 6-8**

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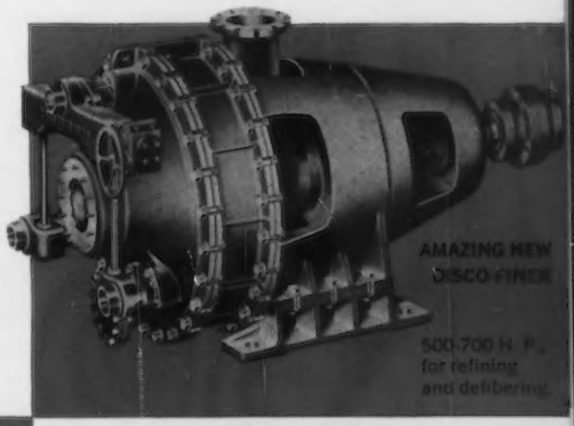

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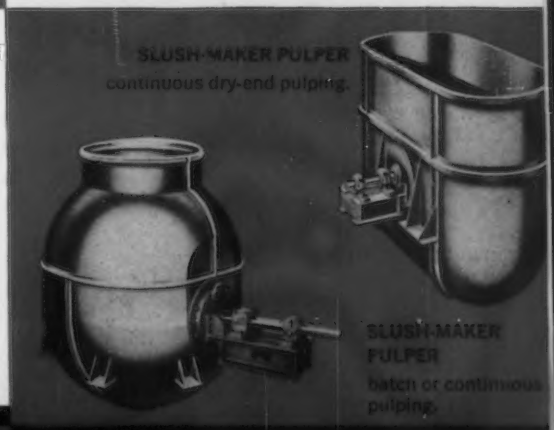

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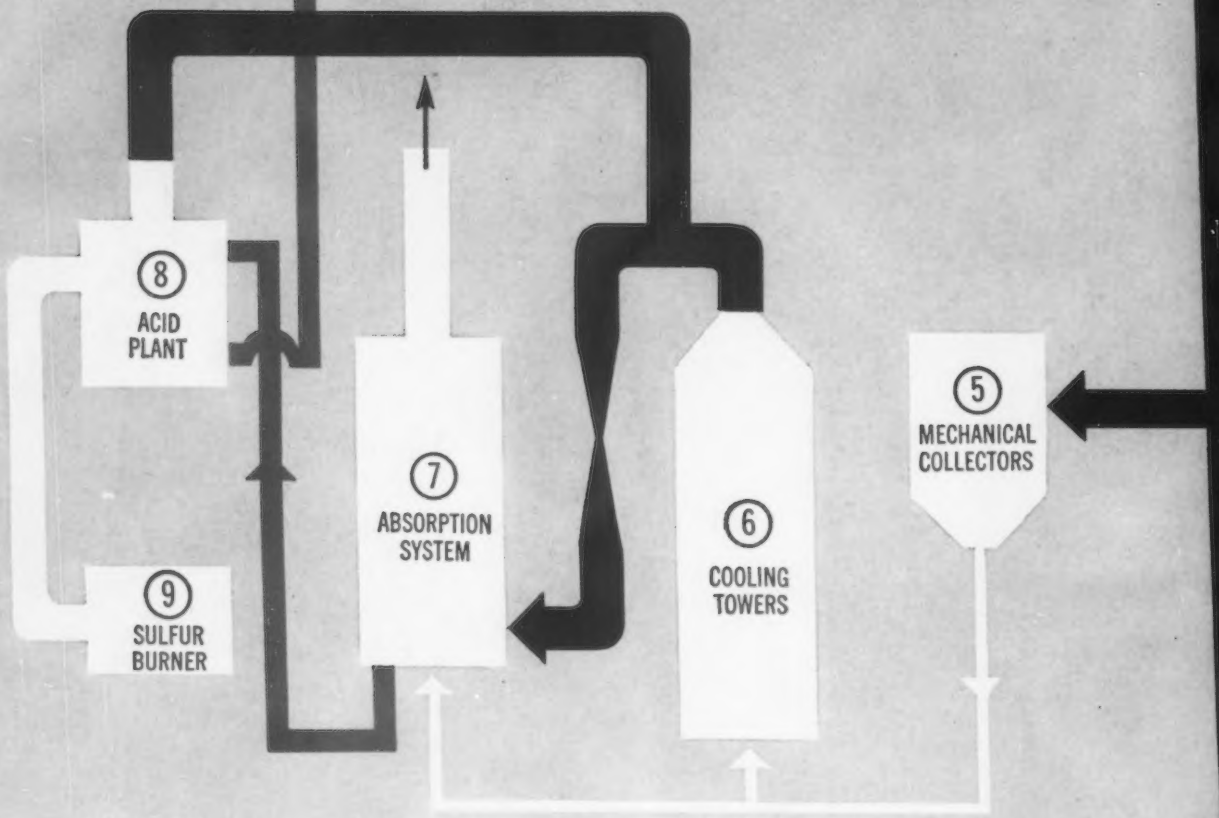
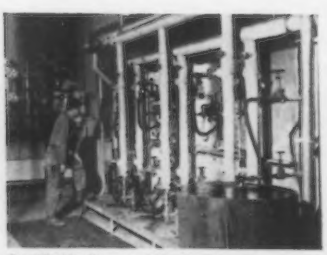
MgO pulping and recovery process. Pulp wood chips are digested in magnesium bisulfite liquor (1) pulp is withdrawn and washed (2) and knots removed. Liquor with 10 to 15% solids is passed through multiple-effect evaporators (3) to raise the solids content to 55% before burning in recovery boilers (4) to produce steam at 860 psi and 825 F for power generation and processing. MgO and SO_2 are released from the liquor during the incineration process. MgO is recovered in mechanical collectors (5) while the SO_2 and flue gases pass to the cooling and absorption towers (6). Recovered MgO is hydrated and introduced into the acid circulating to the absorption system (7). Here it combines with SO_2 to form magnesium bisulfite acid. The cycle is completed by fortifying the recovered magnesium bisulfite acid (8) with sulfur dioxide from the sulfur burner (9).



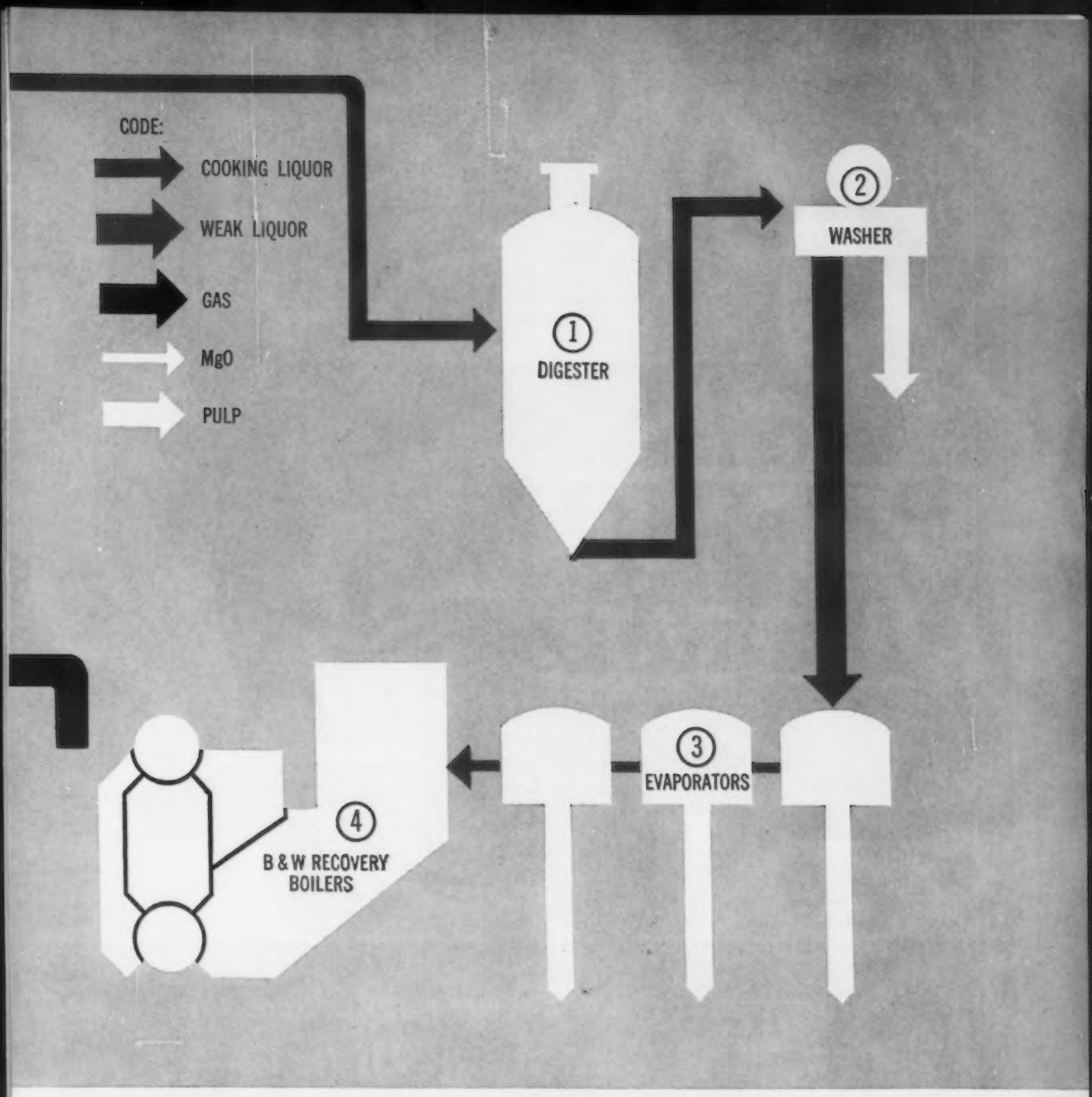
MgO process at Weyerhaeuser's Cosmopolis

Evaporators in series increase pulping liquor from less than 15% to about 55% solids to permit its burning.



B&W MgO recovery boilers burn the concentrated liquor, supplying 70% of the plant's steam requirements.

Mechanical collector reclaims MgO from furnace flue gas and washes it before further use.



Mill recovers 90% of spent liquor solids

Only 20 pounds of magnesium oxide and 40 pounds of sulfur per ton of unbleached pulp are needed for make-up at Weyerhaeuser Company's 400 ton per day sulfite mill at Cosmopolis, Washington.

The simple, closed cycle MgO pulping and recovery process, placed in operation during 1957, reclaims about 90% of the pulping chemicals. The B&W MgO recovery boilers provide 70% of the steam required for the entire plant's power generation and processing needs. A third B&W bark and oil fired boiler provides the balance of steam requirements.

The commercially-proven MgO pulping and recovery process is ideal for either new mills or conversion and modernization of existing mills. Shorter cooking time required for MgO pulping cuts capital and maintenance costs in new installations and permits increasing the production of existing mills. Quality sulfite pulp with high brightness and strength is produced.

For more information about the efficient MgO pulping and recovery process, contact your nearest B&W sales office or write The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio. E-302-1001

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In the meantime, high-purity sodium chlorate is being delivered to U.S. customers in special bulk cars and drums from the Beauharnois plant of Standard Chemical Limited (PPG Chemicals in Canada). It is backed by the same technical service, research efforts and network of 14 district offices that support other PPG Chemical Division bulk chemical raw materials and processing aids.

Call the PPG Chemical Division district office nearest you for more details on sodium chlorate or other basic chemicals.

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Trends

Early July Operating Rates Normal

During the first two weeks of July when a number of mills schedule holiday shutdowns, paper mill operating rates were fractionally below the same period last year and paperboard mills ran slightly higher.

Wage Increase Pattern Shapes Up

The new wage pattern for southern mills seems to be an average across-the-board increase of about 3.5 cents per hour, plus some more fringe benefits. This compares with a 2% increase established earlier for Pacific Northwest mills, which gave a 2 to 10 cents an hour raise. It is difficult to present a fair picture for other sections of the country, due to the variation from mill to mill, but it appears that larger increases were won than in the South or Pacific Coast.

Newsprint Output off 2% in June

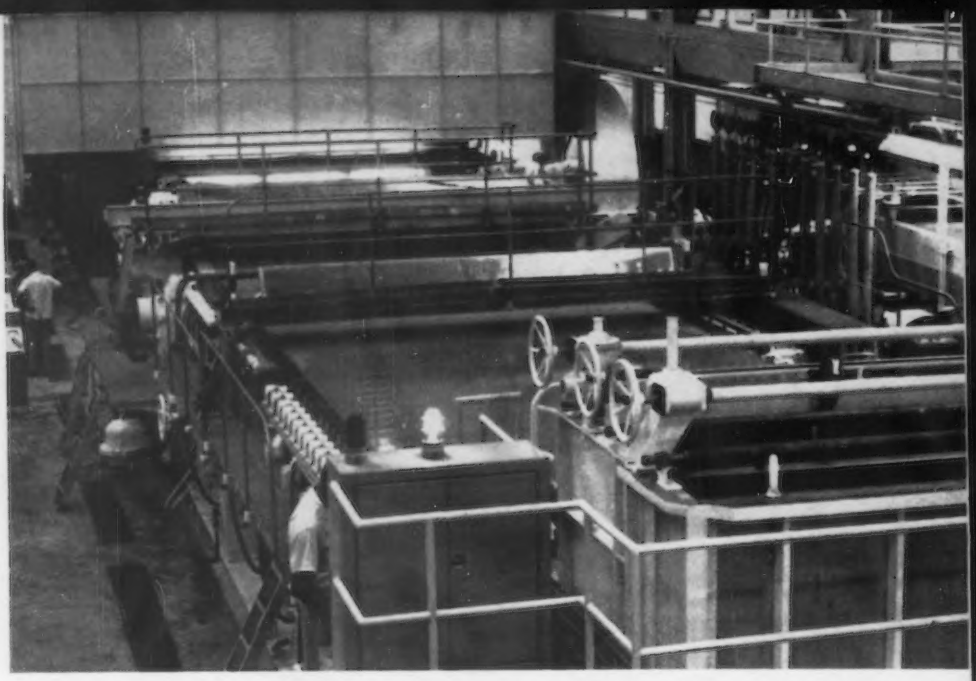
Production of newsprint in North America during June 1961 was 1.8% below that in June 1960, according to the Newsprint Service Bureau. Output in the United States showed a decline of 3.1%. Production in Canada was 1.4% under the year-ago level. Production of newsprint in North America in the first six months of 1961 amounted to an all-time peak for this period and was 1.0% above the level attained in 1960. U. S. output was 2.6% more than produced in 1960. Canadian production was 0.5% above that in the first six months of 1960.

Waste Paper Market Holds Steady

Waste paper market is relatively active for July with prices steady. Latest Bureau of Labor Statistics indicate that waste paper prices are still off more than 25% from a year ago.

Inventory Picture Should Help Upswing

A further boost should be given to the upswing in our industry by the fact of the low inventories of paper, board and market pulp at consumer plants. As soon as it becomes apparent that the present business pick-up is not temporary, purchasers can be expected not only to increase orders to cover requirements but to move to improve their inventory position. In spite of the still occasional price cutting for some grades, continued business improvement can only mean an upward movement in prices.



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Olin Mathieson Chemical Corp.
Pisgah Forest, N. C.

Performance Proof

Surpassing even start-up enthusiasm as the biggest, fastest machine for light weight papers, Ecusta's No. 10 has dramatically stepped up both the mill's capacity and its versatility. It is producing up to 55 tons per day of quality-controlled papers in a great variety of weights from 15 to 40 lbs.

The "Cherokee Arrow" is evidence of sound engineering, precision manufacture and coordination with other equipment. When planning your next paper machine expansion or modernization, call us in to prove what *more* Rice Barton can do for you. *Progress is measured in Results not Claims.*

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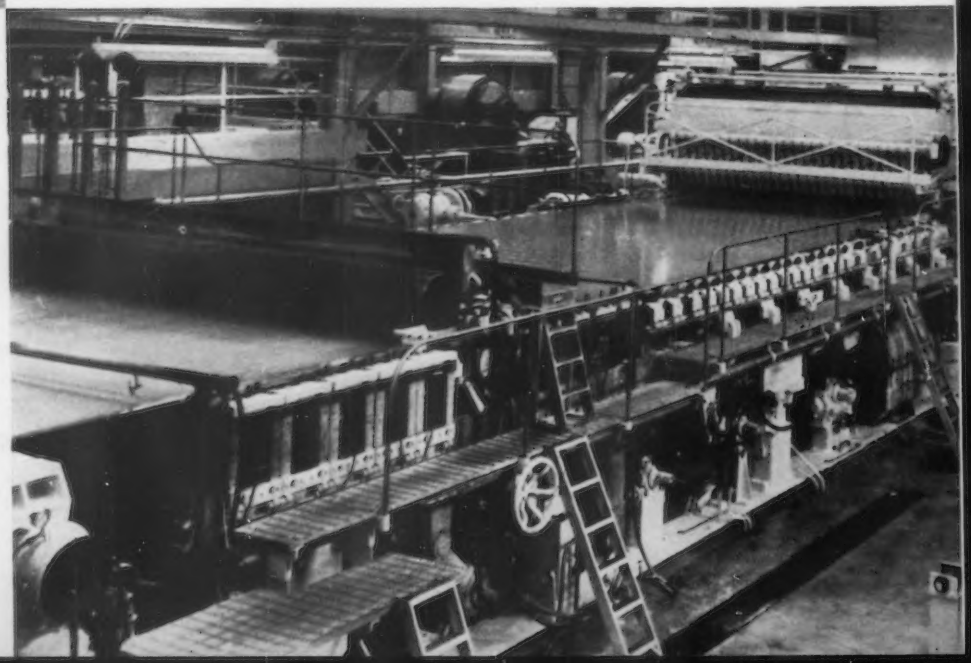


PAPER TRADE JOURNAL

WEEK OF JULY 31, 1961

$4 Million Expansion Program At Crossett Will Double Electrical Power Production

No, it's not time for the countdown for Crossett's first space shot and no one is waiting to recover a nose cone. What you see is a 100,000 gallon elevated water sphere at Crossett Paper Mills. The tank proper will be on top and instead of looking like the missile that it does now, it will have the appearance of a golf ball on a tee. In fact, it is called a golf ball type tank.

It is part of a $4 million expansion program that will double the capacity for the production of electrical power at Crossett Paper Mills.

The all-steel structure as seen here is 125 feet tall. When the tank is erected the overall height will be about 156 feet.

Chicago Bridge and Iron Co. is supplying the materials and erecting the structure, which is located on the northwest side of the Number One mill. It replaces the old tank in front of the boiler house which will be removed to make room for the new turbine room extension.

Included in the installation will be a 20,000 kw. steam turbine generator, a bark-and-gas-fired boiler with an hourly capacity of 300,000 pounds of steam, systems for conveying waste fuels from other Crossett manufacturing divisions and lines to return power and steam to them. Total capacity at Crossett Paper Mills will be raised to about one million pounds of steam per hour and some 36,000 kilowatts of electricity.

The project is scheduled for completion in the latter part of 1962.

Kruger Mill Nears Start-Up in Colombia

The Kruger Organization, Ltd., Montreal based company, announces that construction of its new paper mill in South America is 90 per cent completed. Mill machinery and equipment is now in Colombia and installation is under way. The mill will be the largest of its type in Colombia. The Canadian organization has incorporated a new company, Papeles Nacionales, S.A., in Colombia, which will operate the mill, located near the town of Cartago.

The Canadian-owned Kruger Organization already has a foothold in the South American industry through Papeles Venezolanos, C.A., which operates a large paper mill in Venezuela.

The new Colombian paper mill will go into production towards the end of this year. It will produce wrapping and sanitary papers such as toilet paper, towelling, napkins and light weight wraps. Output will go exclusively to the Colombian market.

The new mill will be started-up with one paper machine and ancillary equipment. However, a second paper machine has already been shipped to Colombia and will be installed shortly after the mill starts up.

Head office of Papeles Nacionales is located in Pereira (Caldas).

$2½ Million Addition for Filer City

Plans for a 2½ million dollar addition to the facilities of Packaging Corp. of America's modern bleached kraft mill in Filer City, Mich., have been announced by J. C. Morris, senior vice president, Paperboard Division. Construction of the building is now under way and completion is scheduled for early fall.

Mr. Morris reported that the current improvements include an 81,500 square foot building to expand the bleached kraft finishing room and provide additional warehouse space, a heat recovery system and additional finishing equipment.

Though no increase in output is contemplated at present, further plans to improve product quality and expand customer service facilities will be announced later, according to Mr. Morris. These will involve additional expenditures and substantial equipment additions to the bleached kraft paperboard machine.

The paperboard machine revisions will permit important improvements in finishes and coatings to provide better printing surfaces for bleached kraft and blended paperboards used in quality packaging of food, pharmaceuticals and other products.

Mead Corp. and Lowenstein To Work on Paper Fabrics

The Mead Corp. of Dayton, Ohio, and M. Lowenstein & Sons, Inc., of New York are conducting a joint investigation of mutual opportunities in the textile industry. This is a combining of efforts to achieve new commercially practical methods for the manufacture of textile fabrics and products using techniques employed in the manufacture of paper.

The research facilities of both firms are now said to be aggressively seeking additional fiber, finishing, and converting technologies applicable to the textile industry.

ENGINEERS AND TECHNICAL PERSONNEL who attended the conference on extensible paper recently held at Sea Island, Ga.

Clupak Holds Third Technical Conference

Clupak, Inc., last month was host to some 40 engineers and other technical people from prominent mills throughout the world which produce Clupak extensible paper. The two-day conference, the third in a series of annual international technical symposiums, was held at the Cloister, Sea Island, Ga. Some 18 companies were represented including men from Finland, Canada, Germany and Japan.

The main objective of the meeting was to review the latest technical aspects of Clupak extensible paper production and to bring all licensees up to date on the very latest research and development work. Discussions covered economic phases of paper production, machine improvements, and new market end-uses.

A special feature of the meeting was a free exchange of information on the production techniques of Clupak extensible paper in the United States, Finland, and Canada with particular emphasis on making kraft multiwall bag paper.

Packaging Corp. Reports Growth Moves to Build Earnings in Coming Year

Packaging Corp. of America has reported a series of growth moves designed to beef up its earnings and its competitive strength in the paperboard and packaging industries. W. D. P. Carey, president, told members of the New York Society of Security Analysts at a recent meeting that moves now under way and in planning will add $14,000,000 to the company's annual sales during its third year and increase its earnings 65 per cent to $1.65 per common share, assuming continued improvement in the nation's economy.

With the opening in April 1961, of the new $41,000,000 kraft linerboard mill of Tennessee River Pulp and Paper Co., 52 per cent-owned by Packaging Corp., the company obtained 91,000 tons of kraft linerboard annually, almost enough to meet the requirements of its 22 corrugated container plants. Mr. Carey said the Counce mill's performance "already has exceeded our most optimistic estimates."

The company now is acquiring a fourth foam plastics packaging operation, in Akron, Ohio, following its entrance into the field of expanded polystyrene plastics only eight months ago with the acquisition of Worcester Moulded Plastics Co., Worcester, Mass. In recent months, it also acquired the plastics division of Lakeside Manufacturing Co., Milwaukee, Wis., and opened a plastics packaging operation in Vincennes, Ind. Foam plastics used in inner packing, Mr. Carey said, has proved to be an effective vehicle to sell more corrugated containers.

"We expected that our packaging engineering and design skills would be of assistance in the sale of plastics; that corrugated and plastics could well be sold together; and that sales of both foam plastics and corrugated containers could be increased without increasing the selling cost. This already has proved to be the case," he reported.

Extension of the company's network of container plants into the Southeast, Southwest, and Texas, is included in Packaging Corp.'s immediate plans. Mr. Carey pointed out that packaging industry growth is more pronounced in these areas than in others.

A $2,500,000 improvement program has begun on the company's bleached kraft mill at Filer City, Mich., to provide better service and superior quality of bleached kraft and blended paperboards.

Production of molded pulp products, principally egg packaging and fruit and vegetable trays, was doubled in the spring of 1961 with an expansion of facilities at Griffith, Ind., and will be doubled again with the opening next year of a large plant now being equipped in Berkeley, Calif.

Commenting upon price reductions in the paperboard industry, Mr. Carey stressed that Packaging Corp. does not subscribe to the "fallacious" idea that indiscriminate price reduction to get volume without regard to cost is a panacea for all business ills. He stated further:

"Although we may have lost some volume by doing so, we have undertaken to maintain a realistic pricing policy based on the concept of profitability. We are stressing the importance of quality and service for our customers. We believe that is good, sound business."

Paper and Paperboard Production

The American Paper and Pulp Association reported the ratio of the United States paper production to mill capacity for the vacation week ending July 15, 1961, at 83.0 per cent, compared with 54.8 per cent, revised, for the preceding week. The ratio was 83.6 per cent for the corresponding week a year ago.

The National Paperboard Association reported the paperboard production ratio for the vacation week ending July 15, 1961, at 73 per cent, compared with 55 per cent for the preceding week and 74 per cent for the corresponding week a year ago.

(Detailed Statistics on page 44)

PAPER PEOPLE

Leonard Dalsemer

G. T. Ward

I-P Realigns Executive Responsibilities

Assignment of new responsibilities to two senior executives of the International Paper Co. has been announced.

George T. Ward, a vice president of the company since 1958, has been designated vice president in charge of manufacturing for pulp, paper and paperboard operations in the United States. Leonard Dalsemer, vice president of International Paper and chairman of its subsidiary, the Lord Baltimore Press, will move his headquarters to the company's executive offices, where he will assume special administrative duties within the company.

Before coming to the New York office in 1959, Mr. Ward had served as chief engineer of the Southern Kraft Division in Mobile, Ala. He joined the company in 1930 and has served in various engineering and operating capacities at several of the Southern mills, being named assistant engineer in 1944 and chief engineer the following year. In 1959 he transferred to the executive staff in New York.

Mr. Dalsemer has been associated since 1928 with the Lord Baltimore Press. In 1929 he established the company's first New York sales office, and since then has served as first vice president and executive vice president.

In 1958 he was named president of Lord Baltimore, and at the same time elected a vice president of International Paper. Later that year he became a member of the board of directors. He will continue as chairman of the board of Lord Baltimore, devoting his attention to broad policy and long-range planning of that subsidiary.

Barrett Plans Intensified R&D Program

Allied Chemical's Barrett Division has four new managers in its reorganized technical department as part of an intensified program of building materials research and development.

Joseph W. Donegan has been named to the newly created post of manager of technical service. Previously, he had been assistant to the director of research and development. Mr. Donegan will be responsible for supervising the commercial applications of new products and providing technical service on existing products. A graduate of Rutgers University, he joined Barrett in 1941.

Richard K. Eberts has been appointed manager of development research. He formerly was a section head in Barrett's research and development department. Mr. Eberts joined Allied Chemical's research laboratory at Morristown in 1946 as a research chemist. He graduated from Lehigh University in 1943.

Robert L. Harris has become manager of laboratory research in the technical department. Prior to his current appointment he had been a section head in the Barrett research and development department. Dr. Harris received a B.S. degree from Bates College in 1947 and a Ph.D. from the University of Wisconsin in 1950. He joined Allied in 1950.

Frank P. Maxwell has become manager of development engineering in the new department. He joined Barrett in 1959 in the engineering department. Mr. Maxwell was graduated from Alfred University, Alfred, N. Y., in 1951. He is a specialist in ceramic and gypsum products.

American Wood Board Elects Officers

The American Wood Board Co., Schuylerville, N. Y., has announced the election of Dallam Blandy as president and Vincent A. Long as vice president.

Graham Blandy, II, who has been president since 1937, retired on July 26 after 29 years with the company. He will continue as a director of The American Wood Board Co. and also as a director of the parent company, Hollingsworth & Vose Co.

L. Q. Harris

Harris Joins A. T. Clayton & Co.

Lloyd Q. Harris, Sr., has been appointed vice president of A. T. Clayton & Co., Inc., New York City.

Mr. Harris joined the Ecusta Paper Corp. of Pisgah Forest, N. C., in 1939 and through 1952 worked in manufacturing, quality control and research. He joined the sales staff of Olin Mathieson's Ecusta Division in 1953 and for six years serviced accounts in the eastern half of the United States, gaining broad experience in printing, bindery and converting operations. In March of 1959, Mr. Harris joined the sales staff of Fraser Paper, Ltd., where he serviced eastern accounts.

John Fulkerson

James Custer

Russell Kacmarynski

Jerry Luebke

Marathon Southern Advances Five

Larry Casey

Marathon Southern Corp., Naheola, Ala., has promoted John Fulkerson to board mill superintendent. Mr. Fulkerson, former assistant superintendent, replaces Benjamin Guenther who recently retired as superintendent. He has been a member of the management team at Naheola for several years, coming south from Marathon Division's Research and Development Division in Menasha, Wis. Before joining the company he was connected with the American Cyanamid Co. He holds a degree in chemical engineering from Iowa State College.

Other appointments announced at this same time follow.

James Custer steps up from maintenance superintendent to assistant paper mill superintendent. A native of Garden City, N. Y., he came to Naheola in 1959 to head up the company's maintenance department. He is a graduate of Purdue University. Joining Marathon Division in 1954, he was maintenance superintendent at Marathon's Rothschild plant before coming to Naheola.

Russell Kacmarynski will replace Mr. Custer as maintenance superintendent. Formerly supervisor of engineering planning at Naheola, Mr. Kacmarynski has been closely connected with the plant's maintenance and engineering operations for several years and represented Naheola management in the recent construction of a substantial expansion project. He joined Marathon Division in 1952 serving as maintenance engineer in Green Bay, Wis.

Jerry Luebke, who comes to Naheola from Marathon's Central Engineering Division in Menasha, replaces Mr. Kacmarynski a native of Kaukauna, Wis., Mr. Luebke has been closely connected with the Naheola production operations since early planning phases. He is responsible for the formulation, coordination, and control of engineering projects involving expansion, change in processes, cost reduction and investigation of operating conditions. He is a graduate of the University of Wisconsin School of Engineering.

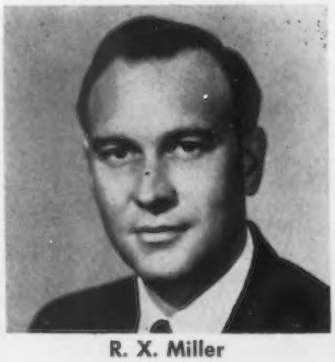
Larry Casey is Marathon Southern's new industrial engineer, replacing Emery Boepple who has been assigned new duties with the Division's Central Industrial Engineering Division. Mr. Casey is a graduate of Marquette University in Milwaukee and first joined Marathon in 1954. His new duties at Naheola involve engineering activity associated with production efficiency and cost reduction.

Scott Names Director for Philippine Affiliate

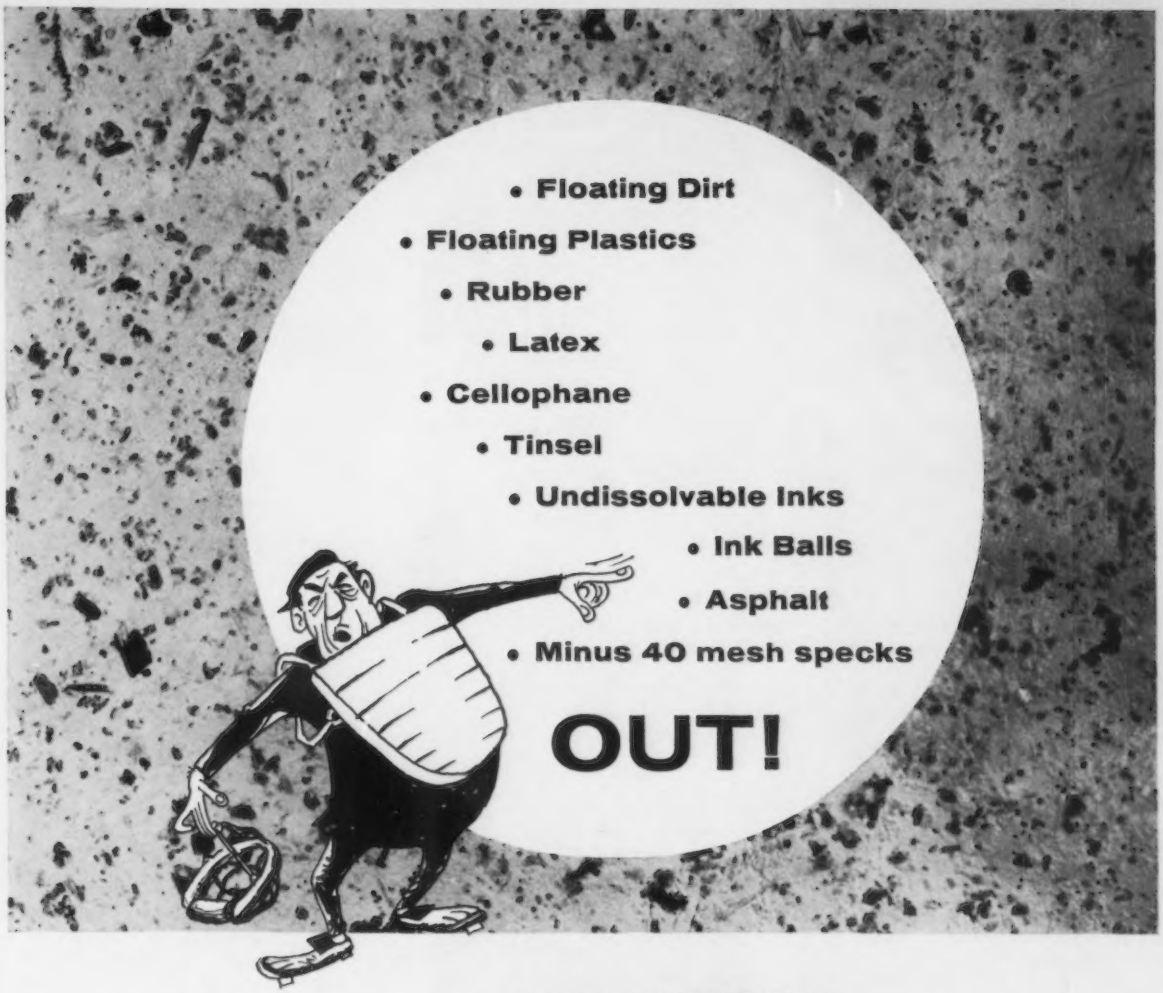
Scott Paper Co. has announced two important promotions in its international marketing operations.

Benton P. Smith, who for the past 15 years has served as Scott's export sales manager, has been named vice president and director of the company's new affiliate in the Philippines, Eastern-Scott Paper Co. He will be replaced by Robert X. Miller, who has been associated with export sales since 1956.

B. P. Smith



R. X. Miller



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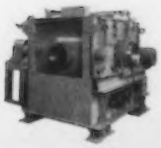
bleached sulphite (68 tpd at 1.6% thru .012″ plates)
unbleached hardwood (100 plus tpd at 1.5% thru .012″ plates)
semi-chemical (86 tpd at 1.7% thru .018″ plates)
board filler stock (110 tpd at 2.0% thru .020″ plates)



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John O'Brien

Russell Elston

Nekoosa Announces Potsdam Administration Changes

Promotions in the Potsdam, N. Y., mill of Nekoosa-Edwards Paper Co., have been announced. The change, effective August 1, resulted from the recent placing of the Potsdam sulphite mill on a stand-by basis.

John O'Brien was named mill manager. He will be responsible for overall operation of the Potsdam mill and will report to C. M. Sigvardt, Port Edwards, manager of manufacturing operations.

Russell Elston becomes technical superintendent, responsible for the technical department, maintenance, power, electrical and general yard operations. He will report to Mr. O'Brien.

George McLennan was named office manager, responsible for purchasing, general services and industrial relations.

Michael Fetcie was named supervisor of accounting and order processing and in addition, will be responsible for costs and traffic.

Burt L. Kassing, who has been resident manager since 1957, and L. J. Berryman, general services manager since 1957, will return to Port Edward for staff assignments.

Mr. O'Brien has been manager of manufacturing at Potsdam since 1960. He was previously production control coordinator and has been associated with the New York mill since 1935. He is a graduate of St. Lawrence University in Canton, N.Y.

Mr. Elston has been technical assistant to the resident manager since 1957. He was previously a chemical engineer at the Nekoosa, Wis., mill since May 1956 and is a graduate of the University of Wisconsin.

Mr. McLennan has been mill purchasing agent since 1947. He has been associated with the Potsdam mill since 1935 and entered the purchasing department in 1947. He attended Clarkson College.

Mr. Fetcie joined the Potsdam organization as mill accountant in November 1960. He was previously employed by Remington Rand at Elmira, N. Y., and is a graduate of Clarkson College.

Parsons Paper Names Manager

Edward P. Bagg, 3rd, has been named manager of the Parsons Paper Division, National Vulcanized Fibre Co., of Holyoke, Mass., succeeding Henry V. Burgee who retired June 30.

Mr. Bagg has been assistant general manager of Parsons for the past five years. He has been with that concern since his graduation from Yale in 1936, except for the 1942-45 period when he served in the Navy.

E. P. Bagg

National Vulcanized Fibre Co. of Wilmington, Del. is a well-known manufacturer of a wide variety of products for business and industry. The Parsons Division is one of the oldest fine paper mills in the country, having been established in 1853.

Mr. Bagg's paper career started in the production department at the Parsons paper mill of which his grandfather, the late Edward P. Bagg, was president.

H. L. Lusby

H. M. Lyle

Lusby, Lyle Join Bowaters Carolina

Homer L. Lusby has been named superintendent, paper manufacturing, and Hubert M. Lyle, superintendent, finishing and coating, for Bowaters Carolina Corp., Catawba.

Mr. Lusby comes to Bowaters with over 25 years of experience in the pulp and paper industry. He was most recently associated with Continental Can Co. as assistant to the general manager, paper and board.

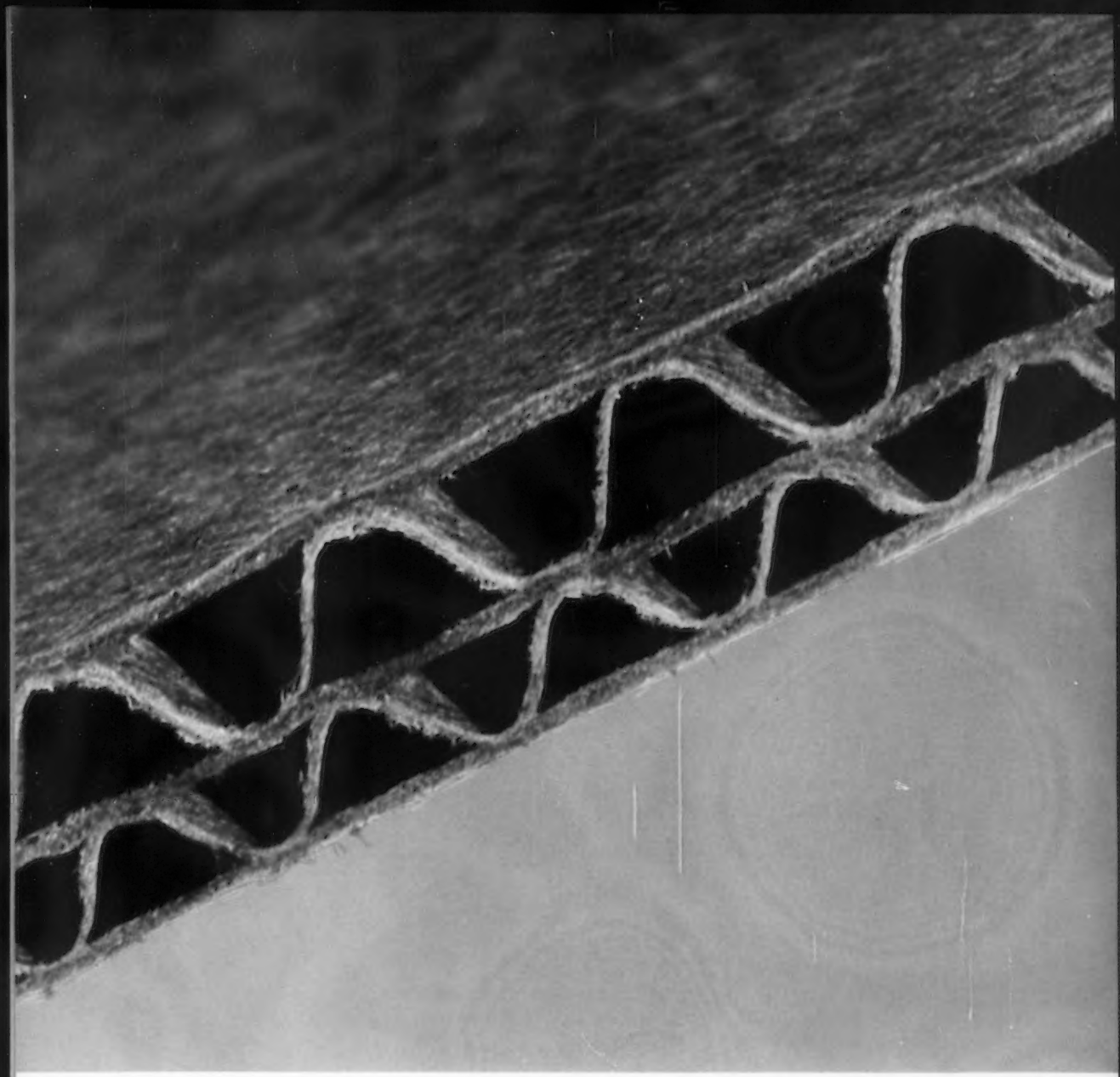
Mr. Lyle joins Bowaters with over 13 years of experience in the pulp and paper industry. He was recently employed by St. Francisville Paper Co., St. Francisville, La. He earned his B.S. in chemical engineering at the University of Washington.

Gillespie Steps Up At Crown Zellerbach

W. F. Gillespie, resident manager of Crown Zellerbach Corp.'s Bogalusa division, has been promoted to assistant vice-president. He will maintain his office in Bogalusa.

C. R. Dahl, resident manager of the St. Francisville, La., paper mill, will replace Mr. Gillespie.

Mr. Gillespie became resident manager in 1956 following a merger of Gaylord Container Corp. and C-Z.



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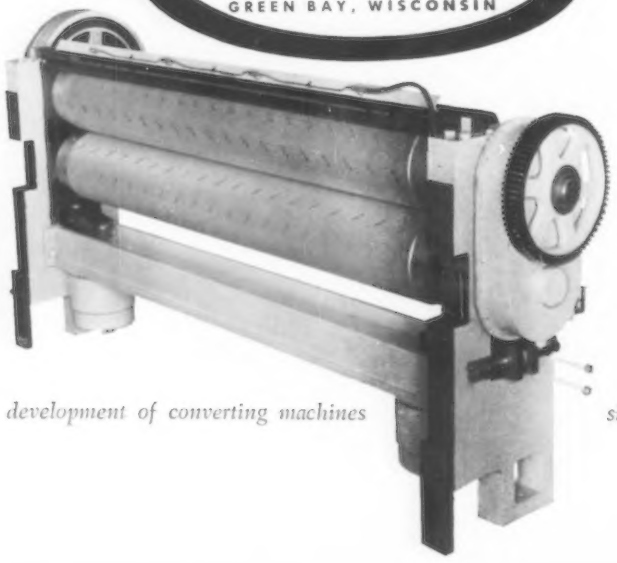

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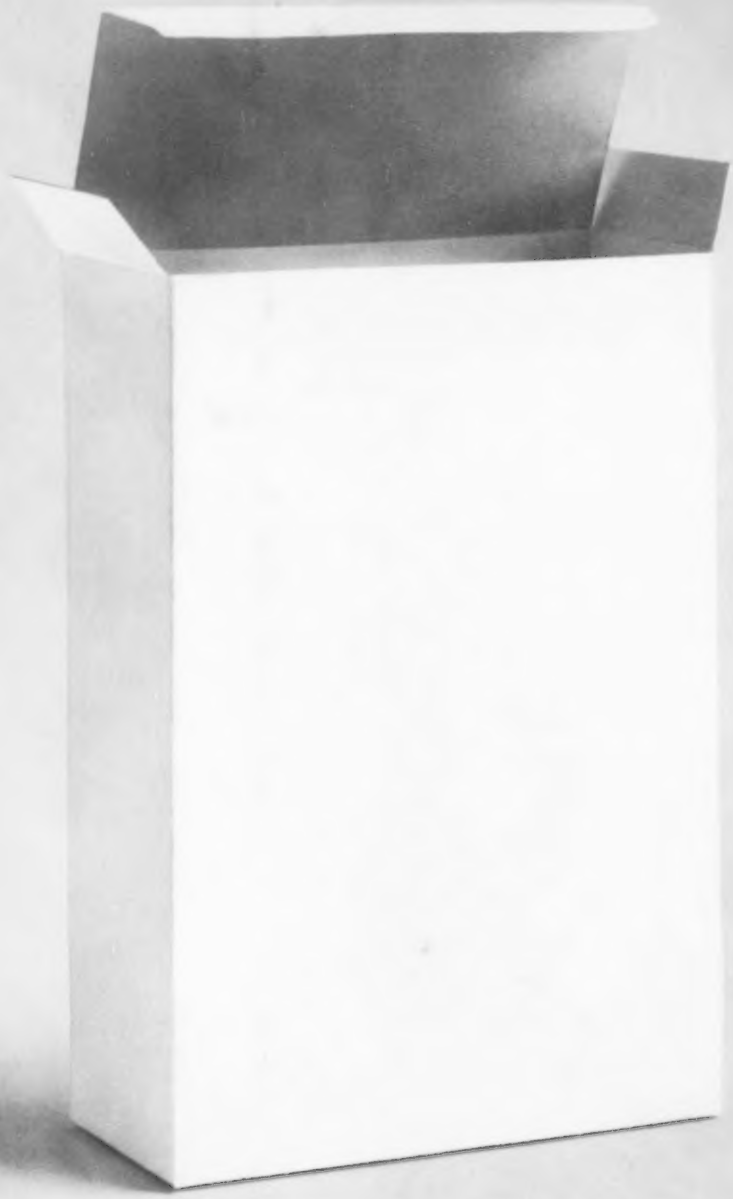

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GOULDS PUMPS

A. L. Ross

Erling Riis

I-P Announces Executive Appointments In Southern Kraft Division

Erling Riis, one of the pioneers of the southern pulp and paper industry, has retired as general manager of the Southern Kraft Division of International Paper Co.

Arthur L. Ross, for 35 years an associate of Mr. Riis, and assistant general manager of the company's southern operations since 1952, has been named general manager C. L. Crain, also a veteran of more than 35 years with the company, has been promoted to assistant general manager. Mr. Ross was elected a vice president of the company in 1953 and Mr. Crain in 1958.

John A. Lyden has been named special assistant to Mr. Crain. Arthur F. Perkins has been promoted to manager of manufacturing and Arthur P. Foster, to chief engineer in charge of engineering and construction.

Mr. Riis will continue to be active with the company as a vice president and member of the board of directors and has agreed to assume overall responsibility for the Southern Kraft Division's manufacture of by-products and its increasingly active efforts in the development of new by-products based on the chemistry of pulp and paper manufacture.

Since 1915, Mr. Riis has been associated with the pulp and paper industry. A native of Norway, he received his education and engineering training there before coming to this country in 1911. In 1920 he joined the late R. J. Cullen as chief engineer of the Bastrop Pulp and Paper Co., which later became the first of the International Paper mills in the South. In 1927, when International Paper purchased the Louisiana Pulp and Paper Co., which had also been constructed by Mr. Cullen and Mr. Riis, they both joined International Paper. Since that time Mr. Riis has directed the construction of each of the seven mills built by the company in the South.

C. L. Crain

Mr. Lyden has served as assistant manager of manufacturing for the past three years. He was twice manager of International's Mobile mill, from 1939 to 1948 and again from 1955 to 1958 and has also served as manager of the company's mills in Natchez, Miss., and Georgetown, S. C.

Mr. Perkins joined I-P in 1935 and received his early experience on jobs involving electrical engineering and construction at four of the company's ten Southern Kraft Division mills. Subsequently, he became construction engineer at the company's Georgetown mill, division pulp mill engineer and assistant manager of the Mobile mill, manager of the Mobile mill in January 1959, and assistant to the general manager in charge of engineering and construction in November, 1959.

Mr. Foster joined I-P in 1933 as a pulp and paper tester in Rumford, Me. Shortly before the installation in Rumford was sold in 1936, he was transferred to Mobile as a draftsman. He later served as an engineer at six of the Southern Kraft Division mills and was promoted to chief engineer of the division in November 1959.

Carson Retires At Bowaters

George H. Carson, an executive in the Bowater organization for 23 years, has retired as vice president and director of Bowaters Engineering and Development, Inc.

Mr. Carson transferred to Calhoun from the Bowater Corp. of North America, Ltd., at Montreal where he was manager of the Engineering Division and director of Bowater's Newfoundland Pulp and Paper Mills, Ltd., and Bowaters Canadian Paper Co.

U. OF MAINE HONORS McCABE—Thomas B. McCabe, president of the Scott Paper Co., receiving an honorary Doctor of Laws degree at the 16th commencement exercises at the University of Maine. Making the presentation are University President Floyd H. Elliott, left, and Vice President Charles E. Crossland, right.

INSECT CONTROL UNIT, Model A. G. 460-30, is shown here installed outside St. Francisville mill.

How a Large Southern Mill Combats the Insect Problem

Electronic insect control equipment offers a new solution to an old problem for the paper industry.

For reasons of quality control, comfort and health, insects are not welcome in a paper mill and thousands of dollars are spent annually to combat them. Yet, with most paper mills necessarily situated in close proximity to a large water supply the area is usually well suited for breeding insects and they constitute an ever recurring problem. Often these flying pests, in addition to being a nuisance to workers, create problems in the manufacture of paper. They may become embedded in the paper, or in a coating applied to improve appearance or printability. In some cases on modern high speed paper machines, insects can even cause a break with consequent costly machine down-time. Needless to say, the elimination of insects is an important consideration in the operation of many paper mills.

Nearly 100% Efficient

A device now on the market does just that—eliminates insects! Said to be 98-99 per cent efficient in a properly engineered system — the units first attract the insects, then electrocutes them instantly on contact with an electric grid. They get no opportunity to build up immunity as with chemical sprays, commonly used to hold down the insect population.

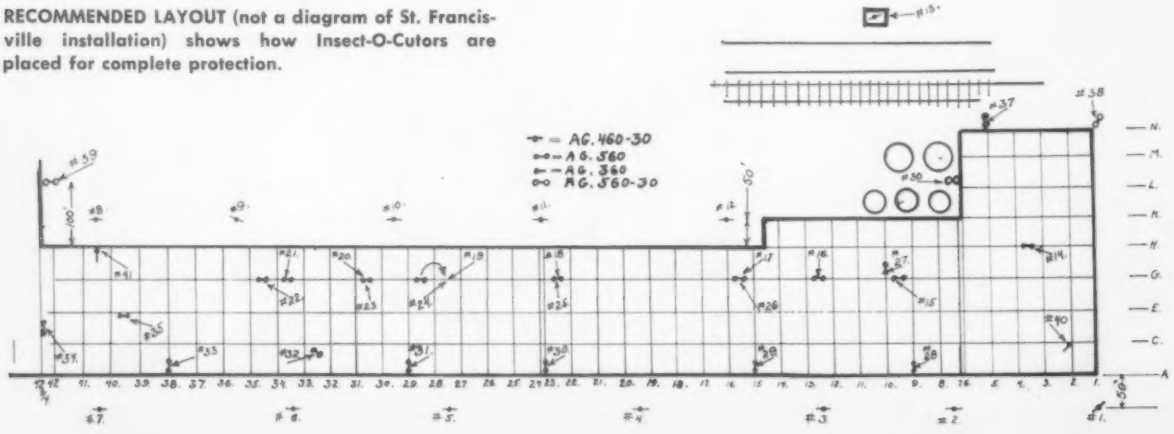
Already is use at several paper mills in the U.S., the units known as Insect-O-Cutors are available in a variety of models. The usual procedure is to place them at intervals encircling the buildings to be protected, with additional units near doors and other openings. Interior units are also used in critical areas to complete the insect protective system.

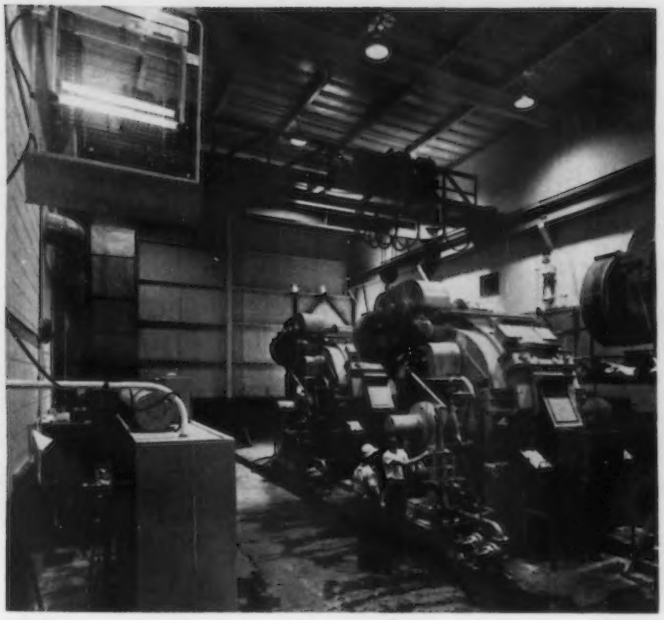
Insects Caused Machine Break

One mill which has encountered and substantially reduced the insect problems is the St. Francisville Paper Co., jointly owned by Time, Inc., and C-Z Corp., in St. Francisville, La. Here, the chief difficulties were large hard shell insects and moths that sometimes flew into the paper machine, became embedded in the paper and caused a perforation when it passed through the press rolls. On occasion the perforation would enlarge and tear across the entire width of the high speed machine, causing lost time.

Spraying was considered as a possible remedy by St. Francisville, but the final decision was to install a system of Insect-O-Cutors. This installation was composed of two A. G. 460-30 units, 10 A. G. 560 units and

RECOMMENDED LAYOUT (not a diagram of St. Francisville installation) shows how Insect-O-Cutors are placed for complete protection.





UNIT AT UPPER LEFT reduces insect problem in St. Francisville grinder room.

HERE, Model A. G. 360 is mounted on steel column near reel of paper machine which produces paper double coated on both sides.

three A. G. 360 units.

The model A. G. 460-30 Insect-O-Cutors are exterior all weather units and the manufacturer recommends they be used to encircle the mill and intercept insects before they gain entrance. They should be spaced 80-125 feet apart, approximately 50 feet from the protected building, and are placed on steel poles embedded in concrete, about eight feet above ground level. The grid size of each unit is 54¾ inches wide x 40½ inches high x 6 inches thick.

Other units are designed for installation inside the mill and at strategic exterior points to provide complete coverage. Model A. G. 560 is a hanging type with a grid size of 74¼ inches wide by 28 inches high by 8 inches thick. The grid size of model A. G. 360 is 28¾ inches high by 24¾ inches wide by 6 inches thick. The units are equipped with catch trays for dead insects and operate on 110-120 volts, 60 cycle alternating current. Power consumption for the larger unit is slightly less than for a 500 watt bulb, and half that for the smaller unit.

For a large paper mill the expense of such an installation is negligible. Among the benefits to be gained are a higher degree of personnel efficiency and comfort as well as improved quality of paper and coatings.

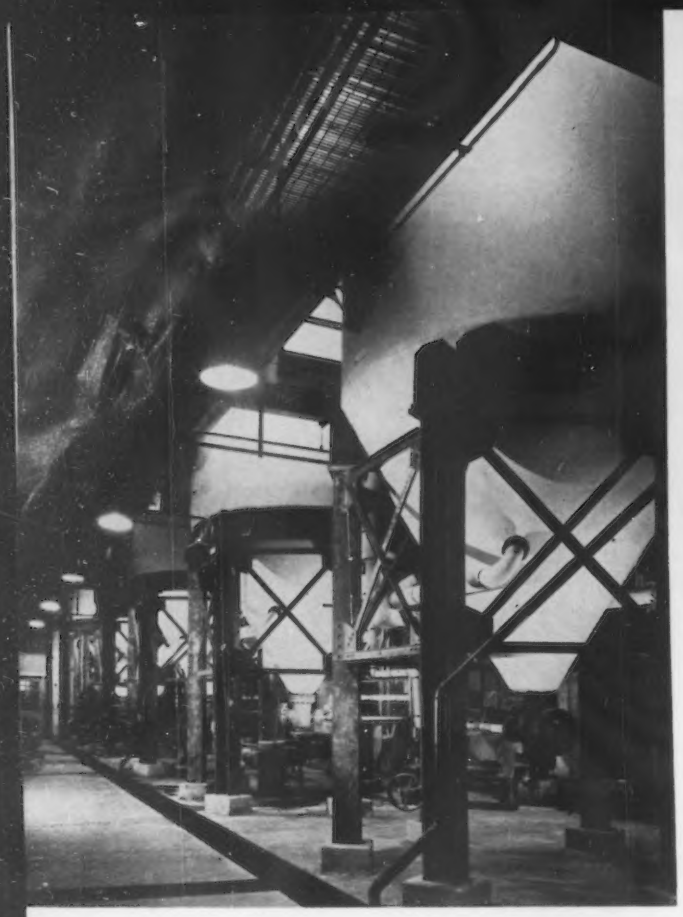
IN THE SUPER CALENDER area, a Model A. G. 560 Insect-O-Cutor is mounted overhead. Mill is jointly owned by Time Inc. and C-Z.

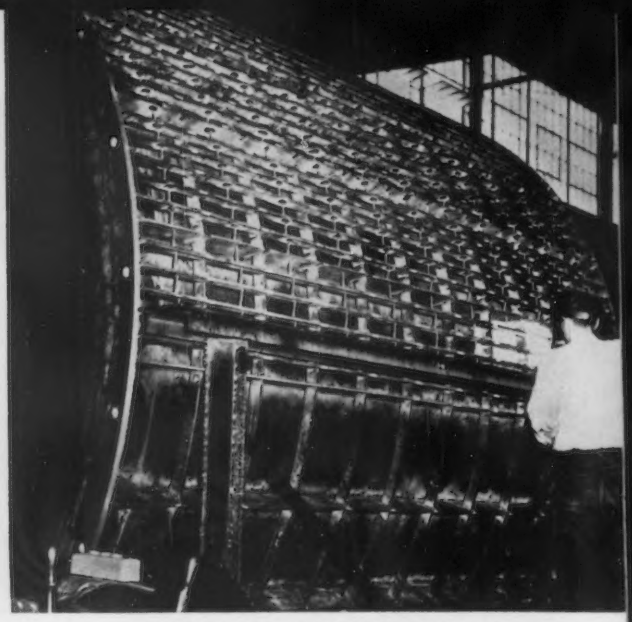
Units Maintenance Free

Available in 17 different models, the Insect-O-Cutor consists of an electric grid, a special transformer and two black lights. These lights have a special attraction for insects over and above other sources of lighting. There are no moving parts to wear out, making the unit essentially maintenance free with a life expectancy of some 20 years or more. Life of the black light tubes is estimated at 7,500 hours with intermittent use, and two and one-half times that long if used continuously.

The tiny amperage running through the electric grid of these units, while immediately fatal to an insect, is quite harmless to human beings, birds and animals. Important considerations in engineering a system of Insect-O-Cutors are: (1.) Use of the correct models; (2.) Selecting the proper locations; and (3.) Installing an adequate number of units.

The Insect-O-Cutor is the result of many years of research and experimentation by Dr. William A. Pohlman, agronomist engineer, with the cooperation of the U. S. Department of Agriculture, General Electric Co. and the Gardner International Corp. of Pompano Beach, Fla. The latter firm is the manufacturer and distributor of the Insect-O-Cutors and also provides engineering service to design large industrial systems.





LAYING A SOUND FOUNDATION for long life on a filter drum for a kraft mill four-stage brown stock washing system. Lateral bars, studs, and divider rings of stainless steel will be covered with 2½ miles of stainless steel wire.

STAINLESS STEEL LININGS in these digesters at a southern kraft mill have given excellent service in the nine years since they were installed. Linings for all four digesters are Type 316L stainless.

Place of Stainless Steel in Fighting Pulp Mill Corrosion

The author reviews corrosion problems and stresses need for each mill to have a specialist. Corrosion problems are discussed for each type of pulping and bleaching.

G. H. Klouman,
Supervisor, Industrial Markets,
Market Development Department,
Armco Steel Corp.

Corrosion is a multi-million-dollar-a-year problem for paper and pulp mills. It has been estimated the cost of corrosion can amount to six dollars per ton of pulp produced.

With corrosion assuming this magnitude, a formalized program designed to minimize its effects through proper materials selection and process execution makes good sense.

A key factor in any program should be a performance analysis of materials now in use in various paper mill situations. This analysis can provide the basis for creative thinking designed to solve a specific problem.

Corrosion Specialists

Delegating full authority for corrosion control to a specialist is the most effective way to get the job done. Yet, many mills either ignore the concept of corrosion engineering or utilize it half-heartedly.

Corrosion control in a pulp mill is a full-time job for an expert in the field. The individuality of pulp mill operations requires solutions to corrosion problems that take into consideration individual mill conditions. Choosing a solution because it has

worked elsewhere is often no more, and sometimes less, than an educated guess.

Past Experience Valuable

However, basic knowledge of just what materials have done in mill situations is invaluable as a point of reference when selecting material for a similar application. The discussion on current mill equipment that follows is limited to that fabricated from stainless steel, certainly one of the major equipment materials in the industry. A comprehensive corrosion chart covering stainless in a variety of corrosive media provides additional data as a guide for materials selection.

Factors to be weighed in making material performance analyses encompass both the nature of the corrosive media involved and the nature of the process and outside factors that affect it. Pertinent points are enumerated in the following check list:

Corrosive Media Considerations

1. Corrosive media—chemical composition (percentage of relative amounts and its pH)

a. State: solid, liquid or gas

b. Impurities, abrasives or suspended solids

2. Temperature—minimum, maximum and average

3. Operating pressure or vacuum

4. Corrosive media movement quiet, agitated or flowing

5. Continuous or intermittent exposure

6. Aeration: moderate, complete or air-free

7. Consistency or viscosity of corrosive media

8. Galvanic factors (other metals or alloys in contact with the corrosive liquids)

9. How the unit is stressed, and in what way (compression, tension, shear; do they vary, or is stress constant, high, low or moderate)

Equipment Considerations

1. What materials have been used previously

2. Time in service

3. Frequency of cleaning

4. How it is cleaned

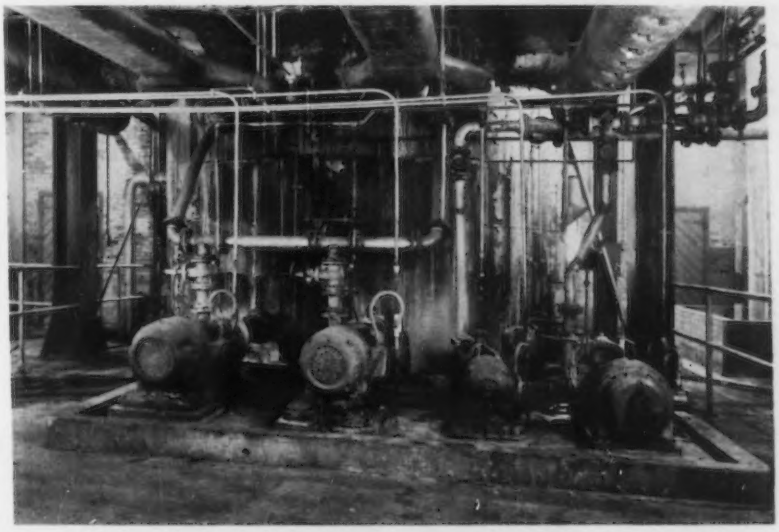
5. If a failure occurred, what was its nature?

6. Present condition of the equipment

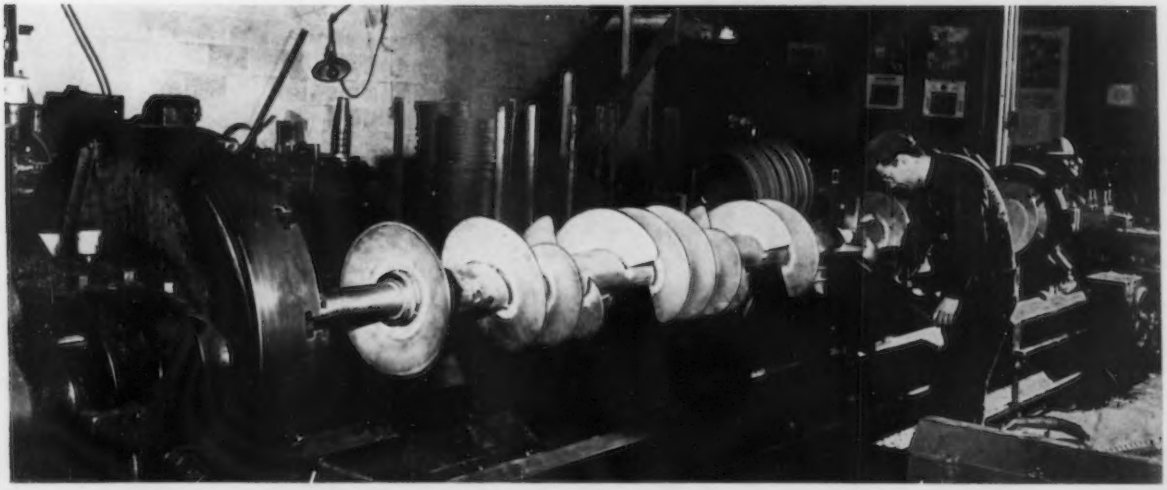
7. Equipment design (corners or crevices)

Kraft Pulping

Kraft mills today have construction material problems as serious as those encountered in acid sulphite pulping mills. These problems have arisen with the need for increased output and better quality. Processing units are expanding. Use of



SIX YEARS AGO, a mill crew lined this green liquor dissolving tank with 14-gage, Type 304L stainless steel. The lining is still in excellent condition. Mill engineers say even the initial cost of stainless was less than a brick lining.



EXPOSED to hot sulphite liquor, screw conveyors of Type 316L stainless steel have given more than seven years' service in continuous kraft digesters, with no sign of failure.

TABLE I — KRAFT PULPING

Process or Manufacturing Equipment	Media	PH	Temp. °F	Duration of Test	Aeration	Agitation	Alloy	Avg. Corrosion Rate (IPY)	Max. Pitting In. During Test
Log sluice behind traveling screen	Kraft and semi-chemical white water	6-8	45-85	222 days	Extensive	1 ft./sec.	Mild Steel	.0064	None
							304	.0001	None
							316	.0001	None
Log sluice in sump	Kraft and semi-chemical white water	6-8	45-85	222 days	Extensive	1 ft./sec.	Mild Steel	.0072	None
							304	.0001	None
							316	.0001	None
Traveling bark screen	Kraft white water (0.025 gpl sulphide, 0.045 gpl sulphate, 102 ppm chlorides)	7.2-8.2	45-85	86 days	Extensive	1 ft./sec.	Mild Steel	.0062	None
							304	.0001	None
							316	.0001	None
Digester—3½-ton rotating (blow end cone)	NaOH 11.5%, 1.5%, Na_2CO_3, Na_2S, etc. Cooking Western Red Cedar pulp		350	31 days	Slight	Some	Mild Steel	.056	None
							302**	.0002	None
							316	.0006	None
							317	.0010	None
Digester—2½-ton rotating (blow end cone)	NaOH 11.5%, 1.5%, Na_2CO_3, Na_2S. Cooking 90% hemlocks, 10% spruce		350	31 days		Yes	Mild Steel	.0006	None
							302**	.0002	None
							316	.0006	None
							317	.0006	None
Digester (liquor heater head)	Kraft black liquor		to 344	68 days	Good	Velocity 2400 gpm	Mild Steel	.095	None
							304	.0005	None
							316	.0008	None
Digester gas-off line (vapors)			200 Avg.	75 days	Yes	Yes	Mild Steel	<.0001	.004
							304	<.0001	None
Digester heater (indirect)	Pine cooking liquor Sodium resinates, soaps		200 to 350	35 days	Slight	4 ft./sec.	Mild Steel	.035	.002
							304	.0001	.004
Washer head box (primary)	Unbleached Stock 1.0-1.5%, 9.5° Bé		190 Avg.	32 days	Yes	Yes	Mild Steel	.0006	.002
							304	<.0001	.001
Flash tank-high pressure evaporator	Kraft black liquor vapors		325	121 days	Good	By vapor flow	Mild Steel	.053	(Corroded Away)
							304	.0001	None
							316	.0002	None
Evaporator, finishing effect (top of tube sheet)	Kraft black liquor, 45-50% solids		258 Avg.	68 days	None	Rapid	Mild Steel	.0021	None
							302**	<.0001	None
							316	.0002	None
							309	<.0001	None
							310	<.0001	None
Black liquor storage tank	Conc: 22° Bé	11.5	195	92 days	No	No	304	<.0001	None
							316	<.0001	None
(between evap. & rotary furnace)	Conc: 32° Bé		200 Avg.	39 days	Intermittent	No	Mild Steel	.0096	.003
							304	.0001	.001
Seal tank, Kraft evaporator	Evaporator condensate—variable, normally acidic with SO_2, formic acid, acetic acid, H_2S (vapor)		130	185 days	Free to moderate	Turbulent	Mild Steel	>.044	(Corroded Away)
							304	.0001	None
							316	.0001	None
Seal tank, Kraft evaporator	(liquid)		130	185 days	Free to moderate	Turbulent	Mild Steel	>.044	(Corroded Away)
							304	.0001	None
							316	.0001	None
Black liquor smelting stack	Kraft black liquor top of stack		160	21 days			Mild Steel	.0027	None
							302**	.0002	None
							317	<.0001	None
	bottom of stack		160	21 days			Mild Steel	.0026	None
							302**	.0002	None
							317	.0002	None
Sump before heat exchanger after condensing system	Recirculated hot water containing black liquor		185 Avg.	166 days	Slight	Some	Mild Steel	.0006	.005 .004†
							302**	<.0001	.002 .002†
							317	<.0001	None None

Recovery boiler, after fan, before precipitator	Flue gases from kraft recovery furnace	310 Avg.	189 days	Moderate	Considerable	Mild Steel	.010	None
						304	.0001	None
						316	.0001	None
						317	.0001	None
						430	.0002	.014
In precipitator	Flue gases from kraft recovery furnace	295	170 days	Moderate	Considerable	Mild Steel	.0004	None
						304	.0001	None
						316	.0001	None
						317	.0001	None
						430	.0001	None
Duct after venturi scrubber	Flue gases from black liquor recovery furnace, Na_2SO_4, Na_2CO_3, SO_2, SO_3, H_2S, CH_3SH, H_2O	160-200	66 days	18% Excess air	Gas flow 2500 ft./min. Na compounds 1.7 lbs./min.	Mild Steel	.012	(Corroded Away) .016 .007†
						304	.0002	.016 .006†
						316	.0097	.010 .006†
						430	.115	None
Flow box from furnace to classifiers	Kraft green liquor— (175-225 gpl as Na_2CO_3)	200 Avg.	68 days	Some	Some	Mild Steel	<.0001	None
						302**	.0002	None
						316	.0001	None
						309	.0001	None
						310	.0002	Low corrosion rate may be explained by heavy carbonate deposits
Distributor box for green liquor recovery	Total Alkali 180 gpl (as Na_2CO_3) 20 gpl (as Na_2SO_4) Total Alkali as Na_2S 20-25%	200	60 days	Slight	Fairly rapid flow	Mild Steel	<.0001	
						302**	<.0001	
						304	<.0001	
Recausticizing unit (agitator)	Green liquor with NaOH as Na_2O: 86 gpl Na_2CO_3; 25 gpl Na_2S; 31 gpl 10% 60 mesh $CaCO_3$ and SO_2	195	35 days	Yes	Yes	Mild Steel	(Corroded Away)	
						304	.0001	None
						316	<.0001	None
White liquor clarifier—Kraft recovery system	White liquor: NaOH, $CaCO_3$, Na_2S	200 Avg.	204 days	None	0.4 ft./sec.	Mild Steel	<.0001	None
						304	<.0001	None
						316	<.0001	None
						410	<.0001	None
White liquor storage tank	White liquor: NaOH, $CaCO_3$, Na_2S	200	204 days	None	Negligible	Mild Steel	<.0001	None
						304	<.0001	None
						316	<.0001	None
Mud thickener—Kraft recovery system	White liquor: $CaCO_3$, Na_2CO_3, Na_2S	180 Avg.	204 days	None	0.3 ft./sec.	Mild Steel	.0035	None
						304	<.0001	None
						316	<.0001	None
						410	<.0001	None
						430	<.0001	None

hardwoods frequently calls for acid pre-hydrolysis. More efficient recovery methods create increasingly severe conditions. Maintenance costs and downtime are growing. Corrosion problems are not only increasing but are becoming more varied. Each mill must solve its own corrosion problems, taking into consideration the analysis and physical properties of the materials flow at each problem area in its operations. There are no generally applied rules that fit all situations.

The strength, abrasion and corrosion resistance of stainless steel have been found to be important in wood preparation equipment, notably chip screens.

In kraft digesters, stainless steels help prevent early failure. Digesters lined with stainless before installation have given good service in many parts of the country. Generally, Type 316L stainless, an extra low carbon grade, is considered the most economical for this service, although digesters lined with Type 347 and other grades are in operation. Field installation of stainless linings has proved unsatisfactory due to eventual cracking from alternating pressures imposed during the cooking cycle. As a result, stainless cladding applied by arc-welding is recommended in the field.

Intensive exploratory work is being done on stainless steel weld overlays for digesters. Metallurgical problems are formidable but it is felt that stainless overlays that resist cracking and provide adequate corrosion resistance are being developed. Field application is relatively inexpensive. Overlays may well be a means for prolonging the life of well over 1,000 kraft digesters in the United States which are rapidly corroding out of operation.

Area of stainless weld cladding varies. In some cases linings or claddings are applied over entire interiors. In others, only areas particularly subject to excessive corrosion are given this protection.

In spite of extensive research, the cause of rapid deterioration of kraft carbon-steel digesters in the past 20 years has not been accurately determined. No permanent solution has been offered other than the installation of stainless-lined digesters.

Typical Digester Installations

Typical of corrosion resistance shown by stainless linings are five 316L stainless-lined digesters installed nine years ago in a southern mill. The linings are still holding up after almost continuous opera-

tion. At another western mill, where three new kraft digesters were lined with stainless steel, engineers estimate that the reduction in shell thickness made possible by stainless steel resulted in significant cost savings. Because less stainless was needed for the job than carbon steel, the price differential was more than compensated.

Digester Accessories

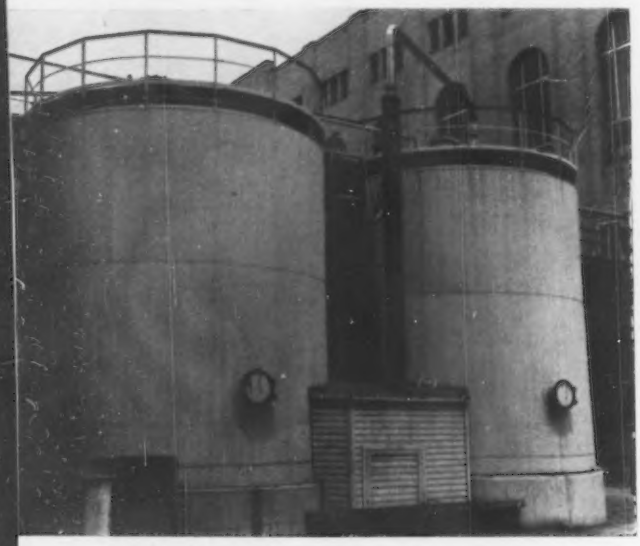
Digester accessories also benefit from the corrosion resistance of stainless steels. Types 316, 316L and 317 are used for nipples and nozzle linings on liquor inlets and outlets, as well as for blow valves and digester sleeves. Types 303, 304, 316 and 317 improve reliability of digester circulating pumps, especially when used in impellers, shafts and seal rings. Types 304 and 316 give long service life for tubes in indirect heaters for digesters. They also have prevented trouble in surface condensers used to condense blow-off steam. Stainless digester pads and steam rings are equally satisfactory.

In handling hot liquors, Type 316L is again felt to give better service than any other grade of stainless steel. Reason is that 316L has most of the necessary abrasion and corrosion resistant properties, is readily weldable and is economical.

One of the most recent developments in kraft pulping embodies conveyor screw flights of Type 316L in continuous kraft digesters. One such screw conveyor has been in service for seven years. The corrosion rate of its Type 316L stainless surface was 0.0008 inches per year as compared to 0.095 inches per year for a carbon steel conveyor in the same media — hot kraft cooking liquor.

Pulp Processing

Operating conditions for each piece of equipment in individual mills must be the final basis for judgment in selecting materials for construction. Only a corrosion engineer intimately familiar with individual mill operations can give specific recommendations to the mill operator. Generally speaking, in kraft pulp processing after the digesters, Types 304 and 304L have proved satisfactory and are generally the most economical grades for the great majority of stainless steel equipment items.



BOTH these large accumulators at a calcium-base sulphite mill are lined with Type 316L stainless. They are holding up well after eight years in this punishing service.

Pulp piping is the most universal application for the 18-8 ECL types of stainless. When extremely corrosive materials with very high or low pH values are encountered, Types 316 and 317 should be investigated. Pumps throughout kraft pulp processing systems are also largely either 304, 304L, 316 or 317.

A smooth surface facilitating cleaning and the ability to withstand corrosion and wear make stainless steel an economical choice in rifflers, decker screens and pulp screens. Flat screens in one mill, from headboxes and screen plates to collecting troughs, are made of Type 304L stainless steel. In this case the screens, consisting of 10 lines of 26 plates each, have been in continuous service six years without failure, except for accidental mechanical damage to individual panels. More years of service are expected.

Many knotters are constructed throughout of Type 304L to resist attack from corrosion and wear, whether they are located before or after brown stock washers. The multi-stage washers themselves are frequently stainless from stem to stern—rods, winding wire, wire cloth screens, even vat linings.

There may be cases, again depending upon the specific mill conditions, chemicals in the mill liquor, and so on, where 316 stainless might be more advisable in these applications. This should be determined by the mill's own corrosion engineer based on his experience.

Blow Tanks

Sometimes entire blow tanks are made of 304L stainless. More commonly, stainless steel is reserved for conical bottoms and perforated plates that take the brunt of wear and corrosion. If the blow tank were a high temperature operation, 316 stainless would be recommended for its high-temperature strength. Since the only heat that gets into the tank is from the pulp and the tank can be washed down with water immediately after pulp delivery, 304L is generally used.

Black Liquor Evaporators

Conditions in black liquor evaporators are among the severest of all. Evaporator shells, baffles, header sheets, pumps, fans and other accessories are fabricated from stainless steels to withstand both corrosion and erosion. But multiple-effect evaporator tubes represent one of the best examples of how stainless steels can reduce costs. Stainless steel tubes are especially advantageous in the feed effect to resist sulphide attack on the steam side. In general, however, Type 304 stainless is used for first, second, and third effect tubes, although some mills use it for tubes in all effects to guard against potential trouble.

One kraft mill reports that its carbon steel black liquor evaporator tubes lasted an average of six months. Replacement of the tubes was costly and in January, 1954, carbon steel tubes were replaced with 2-inch diameter, Type 304 stainless steel units. The stainless tubes are still in operation. These tubes were in the primary of first effect area where the severest corrosion occurs.

In the same northern mill, based on the first experience, Type 304 stainless steel, 14-gage tubes were installed in the second effect. Again, the tubes are still in operation.

Costs on the tube replacements were estimated at $5,000 for carbon steel as opposed to $22,000 for stainless steel welded tubes. Figuring the

carbon steel tubes would have to be replaced every six months for over seven years, the cost of carbon steel tubing to date would be over $70,000. Actual saving by using stainless is around $48,000 plus lower maintenance costs.

Stainless Pipe Advantages

Even though carbon steel pipe has been coated with plastic or ceramic pipe lining, the linings, though corrosion resistant, are friable. They crack easily. Once a pipe is dropped, the damage to coating is irreparable. Stainless steel pipe has another advantage in the mill — because a thinner wall can be used, and can readily be moved around by mill maintenance people. It can be welded repeatedly, equipped with flanges, molded, taken down again, and modified very easily. Since much of this pipe is overhead, its light weight eliminates the necessity for extremely sturdy, heavy supports or hangers.

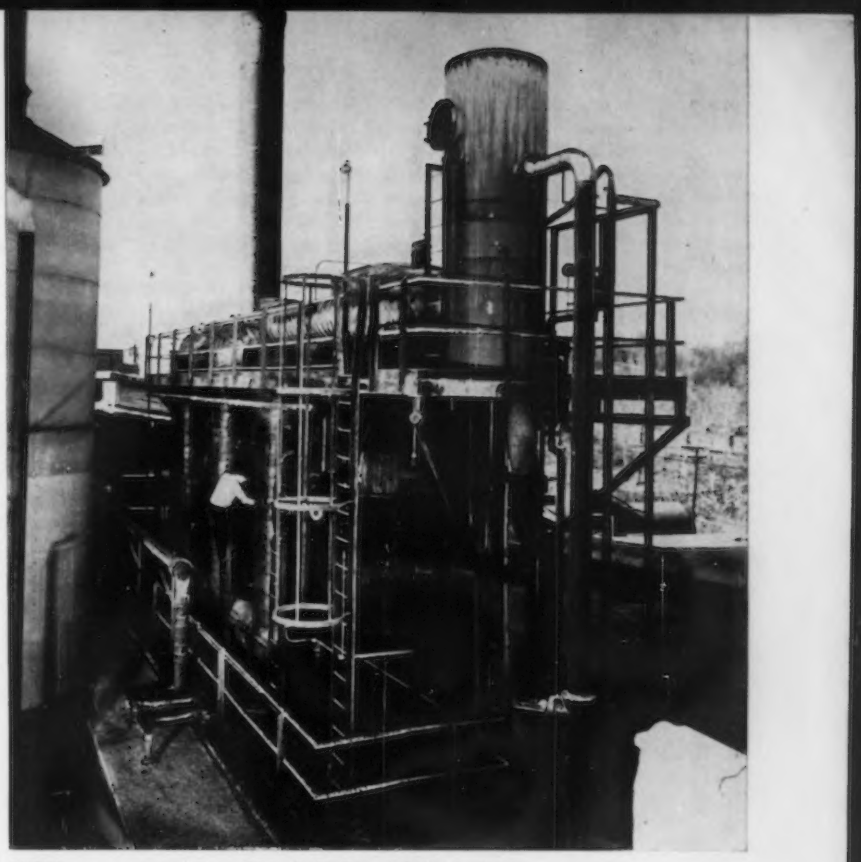
Carbon steel is still used, particularly in waste and water lines—areas where corrosion won't contaminate paper stack. Another non-stainless pipe is plastic lined or full plastic pipe.

One trouble with plastic pipe is that wear on the inner wall produces wells and irregularities. In these uneven areas wood fiber can catch and build up, then release into the flow to form fish eyes in the paper stock. Another problem with plastic piping is aging and brittleness.

Recovery system piping and ducts are largely stainless steel, not only to resist attack from corrosive liquids, but in more and more cases to fight scaling and the damaging effects of sulphur-bearing gases.

Mixing, dissolving, and liquor storage tanks are frequently made from or lined with stainless steel to eliminate corrosion problems. A northern kraft mill, for example, lined a green liquor dissolving tank with 14-gage, Type 304L stainless steel six years ago. Even the initial cost was less than a brick lining. It is still giving trouble-free service.

For heat-resistant applications such as furnace spouts, Type 309 stainless steel is best for the price. This alloy can be replaced by Type 310 for greater scaling resistance due to its higher chromium and nickel content. Type 314 contains added silicon for even greater resistance to scaling. Under normal mill operation, Type 309 should have sufficient heat resistance for most uses. All heat resistant grades are ductile, machinable and produce strong welds easily. All have high temperature tensile and creep strength.



TUBES are annealed Type 304, shells Type 304L, in all four effects of this black liquor evaporator at an NSSC mill.

Sulphite Pulping

Sulphite pulp mill equipment operates in some of the most corrosive environments known to the industry. Higher SO_2 content of calcium-base cooking liquors is a prime contributor. The newer ammonium bisulphite, sodium bisulphite and neutral sulphite processes, in addition to the older calcium bisulphite process, have one thing in common. The bisulphite radical is necessary in the pulping operation. It is the bisulphites that provide the great amount of corrosion that would affect ordinary material such as carbon steel.

Digesters in this service have either been lined with silica or carbon bricks or with stainless steel. Most of the stainless steel linings have been working quite well. Digester problems, however, have never been 100 per cent solved through the use of stainless steel linings. There are areas where sulphite digesters are still suffering from attack, particularly the vapor zone at the top of the digester dome.

In this difficult sulphite service, most applications call for highly corrosion-resistant molybdenum-bearing steels such as 316, 316L and 317. The difference between 316 and 316L is the lower carbon content (0.03 per cent max.) of the latter as compared to 0.08 per cent max. for Type 316. Type 317 stainless has higher percentages of chromium, nickel and molybdenum than either 316 or 316L.

Acid Preparation

Engineers in various sulphite mills report that stainless steels, when periodically cleaned, resist the corrosive effects of sulphur dioxide solutions, even though they are strongly reducing. This accounts for their widespread use in valves, fittings, lines, tanks, and other equipment items that come in contact with sulphurous acid during liquor preparation.

Even in gas preparation and cooling, non-ferrous materials are giving way to stainless steel. Engineers at a northern mill, for instance, have switched from tellurium-lead to Type 316 stainless steel for SO_2 gas lines. One benefit they emphasize is strength with light weight. Extensive supports and special framing required with the heavier lines are no longer necessary. The same mill uses stainless steel for acid lines from

storage tanks and the SO_2 cooler.

Dry gas fans are being fabricated from Type 316 stainless, as are linings for absorption towers. At a mill using ammonium-bisulphite liquor, experience shows long life and low maintenance for a stainless cooling tower and two stainless steel acid towers. Other mills report equally good results. Types 316 and 317 stainless have also demonstrated their good corrosion resistance in acid storage applications. For example, excellent service has been experienced at a mill operating on calcium-base liquor for acid accumulators with resistance welded linings of Type 316L stainless steel. These linings have been in use for eight years.

Digesters

Several sulphite mills are at present operating digesters lined or weld-clad with stainless steel. Most linings are presently 316L. Corrosion data on any given stainless steel will not necessarily indicate that it will stand up in sulphite solutions. This is true for exposure to sulphur dioxide atmospheres where solution in water results in sulphurous acid with a tendency to pick up oxygen in the air and become sulphuric acid. If the stainless steel is allowed to remain in this reducing solution continuously, the steel becomes activated—it loses its protective oxide film and begins to pit and corrode.

The theory is that an invisible chromium oxide film builds up on the surface of stainless steel and acts as a barrier to further oxidation. Sulphite solutions tend to break down the oxide film and start corrosion. Periodic cleaning and air drying replaces the chromium oxide film and restores the corrosion resistance of the metal.

In sulphite digester circulating systems—acid lines, pumps, relief lines—Types 316 and 317 stainless have shown their durability for many years. Other stainless accessories, such as digester collector rings and screens, also deliver dependable, low-maintenance service.

Sulphite Pulp Processing

Blow lines of stainless steel protect pulp purity, a particularly important consideration in the production of dissolving pulp, where freedom from contamination is especially vital. Several mills also report that it greatly improves life of target plates. For perforated bottoms, many mill engineers consider stainless steel superior to both tile and wood, not only because stainless is so resistant to corrosion and wear, but because it is practically non-plugging and difficult to dislodge in service. Stainless also serves well in valves, nozzles, pumps, pipelines, save-alls, and similar blow pit accessories. Here again, Types 316, 316L and 317 stainless are preferred, although some mills have had some success with Type 304L in blow pit parts.

Stainless grades such as 316 and 317 are desirable for stock valves and lines to knotters and hot stock chests —wherever unwashed acid stock is

TABLE II —

Process or Manufacturing Equipment	Media	PH	Temp. °F
Digester (below upper cone)	Digester liquor—8.23% total SO_2, (7.02% free SO_2—1.21% combined SO_2)	1.32	268
Digester (collector ring)	Sulphurous acid, calcium magnesium bisulphite		104-286
Digester (strainer)	Sulphite liquor—7.5% total SO_2 (1.2% combined, 6.3% free)		172 Avg.
Digester (cover)	7.87% total SO_2 (1.05% combined, 6.82% free)		143-291
Digester	Sulphite cooking liquor pulp solution plus 5-6% SO_2		284
Blow pit (under strainer)	Sulphite pulp and wash water	3.0-4.0	77 Avg.
Blow pit drain	Waste sulphite liquor Max. conc. SO_2 0.03%		120
Blow Tank Vent Lines	Vapor, SO_2 gas, Spool 1		180 Avg.
	Mg base liquor, Spool 2		180 Avg.
Knotter Screen Head Box		4.3	44
Knotter head box	Sulphite pulp	6-7	80 Avg.
Headbox to unbleached rifflers	Sulphite pulp--previously treated with calcium bisulphite cooking liquor--containing lignosulphonic acid.	6.5	68 Avg.
Screen head box	Sulphite pulp, consistency 0.25-0.60%	4.5-6	51 Avg.
Bird screen bleeder box	Sulphite white water	4.4	90 Avg.
Decker white water chest	Sulphite white water	4.4	55
Decker (In Flume)	Unbleached sulphite white water	6.8	50-65
Seal pit-deckering sulphite stock	Sulphite stock white water—0.02% consistency	4.7	62
Sulphite seal pit	Wash water from sulphite stock	5.75	60 Avg.
Washer headbox	Some cooking liquor present	5.5	68
Headbox—machine for lapping of unbleached sulphite pulp	Sulphite pulp—7% consistency with traces of SO_2 groundwood pulp, calcium bisulphite liquor paper machine white water	5.0-5.5	55 Avg.
Waste Liquor	Calcium bisulphite liquor	3.5	266

handled. They can provide equally good service in knotters and washers. At one ammonium-base mill, for example, knotters, vacuum filters, and multi-stage counter-current washers (hoods and all) are constructed entirely of Type 316L stainless. After five years of severe service, they are still in top condition.

Stainless steels are being widely used in new processes for utilization and disposal of sulphite wastes, as well as in the more conventional recovery methods. Developments at thirteen sulphite mills are evidence of the great growth of the newer processes. From 1951 to 1958, these thirteen mills increased their combined total of sulphite solids produced from 15.6 per cent to 63.5 per cent a year. And the trend is still upward.

SULPHITE PULPING

Duration of Test	Aeration	Agitation	Alloy	Avg. Corrosion Rate (IPY)	Max. Pitting In. During Test
54.5 days	No	Slight	Mild Steel	(Corroded Away)	
			304*	<.0001	None
			316	<.0001	None
			317	<.0001	None
27 days	Intermittent	Slight	Mild Steel	>.32	
			304*	.0005	None
			316	.0002	None
			317	.0002	None
51 days			Mild Steel	(Corroded Away)	
			304*	.0005	.007 .006†
			316	.0001	None None
			317	.0001	None None
28 days	No	Some	Mild Steel	(Corroded Away in One Day)	
			304*	<.0001	None
			316	<.0001	None
			317	<.0001	None
69 days			304*	.0007	None
			316	.0005	None
84 days	Moderate	5 ft./sec.	304*	<.0001	.001
			316	<.0001	None
41 days	Some	Yes	Mild Steel	(Corroded Away)	
			304*	<.0001	None
			316	<.0001	None
17 days	Moderate	Considerable	316	.0013	Local etch
			317	.0001	None
17 days	Moderate	Considerable	316	.002	Local etch
			317	.0001	None
75 days	No	Turbulent	Mild Steel	.0088	.006
			304	<.0001	None
			316	<.0001	None
180 days	Considerable	Considerable	304	.0001	Local etching
			316	.0001	None
			317	.0001	None
79 days	Negligible	75 ft./min.	304	<.0001	None
			316	<.0001	None
106 days	Extensive	High Velocity	Mild Steel	.0063	.030
			304	.0001	None
			316	.0001	None
			310	.0001	None
140 days			304	Wt. gain	None
			316	Wt. gain	None
294 days	Moderate	Mild	Mild Steel	.0038	None
			302**	.0001	None
			316	.0001	None
175 days	Moderate	By flow in flume	Mild Steel	.011	None None
			304	<.0001	None None
			316	<.0001	None None
			430	<.0001	.001 .003†
93 days	Some	Some	Mild Steel	.0058	.012 .012†
			302**	<.0001	None None
			316	<.0001	None None
140 days	None		304	<.0001	None
			316	<.0001	None
82 days	No	Yes	304	<.0001	.001
			316	<.0001	.001
176 days	Good	1 ft./sec.	302**	<.0001	None
			316	<.0001	None
			430	<.0001	None
132 days	Some	Intermittent	Mild Steel	(Corroded Away)	
			304*	.0001	Incipient
			316	.0001	Slight

Recovery Processes

One of the main reasons for use of stainless steels in recovery equipment is their ability to withstand corrosive waste liquors. This makes them exceptionally useful in handling some of the more easily-produced spent liquors, such as ammonium-bisulphite.

More efficient systems for recovery of chemicals, heat and steam draw upon the durability of stainless steels for dependable operation. Type 316L stainless, for example, is widely used in heat-sulphur recovery systems for hoods, ductwork, butterfly valves and heat exchanger parts.

Spent liquor handling equipment of stainless steel gives noteworthy service. A northern-calcium-base mill has an entire spent liquor system, from flash tank to vent pipes and filters, made of Type 316 stainless. After eight years the equipment remains sound and serviceable. This same type of stainless has proved itself as a construction material for SO_2 stripping towers, according to engineers at a midwest mill operating on ammonium-bisulphite liquor.

Stainless steel is equally important in evaporators used to concentrate waste liquors before burning or treating. Essentially, it resists the corroding effect of sulphur in evaporating liquors. One of the mills has reported that a multiple-effect evaporator of Type 316L stainless has given trouble-free operation since its installation seven years ago.

Besides corrosion resistance, stainless steel provides a clean, solid surface that is a virtual necessity in the many types of equipment for processing of by-products in which strict purity is vital. In a sulphits liquor recovery plant, spray driers, dust collectors, expansion joints, ducts, and many other items in by-product processing are fabricated from Type 316 stainless steels to assure freedom from contamination.

In an ammonium-base operation, after the sulphites have been stripped out and where torula yeast is an important end product, nearly all equipment in the yeast plant is Type 304L stainless. This includes hoods, hammer mills, and screw conveyors in dryers; centrifugal separators; and yeast fermenting tanks.

Soda Pulping

Environments in soda pulp mills were once considered quite mild. Corrosion was a minor problem. Today, the replacement of carbon steel equipment with that of stainless steel is indicative of steps taken to resist the apparently increasing corrosiveness of soda processes. Some soda mills operate digesters lined with stainless steel. Others protect critical digester areas with stainless weld overlays.

Reason for the apparent trouble is better quality control. Where carbon steel had once been used successfully in soda processing mills, greater demands for higher tensile strengths or cleaner paper mills means tolerances have to be up-graded. Carbon steel pipes cause troublesome contamination that went unnoticed before.

Because soda pulping equipment is similar in design and function to that used for kraft pulping, stainless steels often assure low maintenance and cleaner pulp in many similar operations and equipment. Washers, screens, multiple-effect black-liquor evaporators, pumps, valves, piping and green liquor handling equipment are typical examples.

In one midwestern soda mill stainless steel weld overlays are used in parts of four digesters. Liquor heaters are Type 316 stainless. A sodium chlorate storage tank is Type 316 stainless-clad. High-density pulp storage tanks are clad with Type 304 stainless steel in order to control slime deposits and promote cleanliness. According to mill engineers, the tile linings previously used were difficult to clean. Bleached stock hung up in mortared joints and crevices, contributing to slime growth and stock contamination. Stainless steel are also used for bleach washers.

Groundwood Pulp Production

Most corrosion problems in groundwood processing are caused by weak acids released in grinding, and by saline water (as in coastal areas). Such attack is rarely severe enough to substantially shorten life of carbon steel equipment. However, the trend toward brighter groundwood pulp often points to use of stainless steels to avoid iron contamination.

Besides improved groundwood quality, some mill engineers prefer stainless steel for critical equipment items because they feel that low maintenance costs and longer service life more than compensate for higher initial cost. Of course, stainless steel is frequently used in groundwood processing to resist wear and promote cleanliness in screens, deckers, stock chests, piping, and other items similar to those used in processing of chemical pulp.

In many cases, the 400 ferritic chromium series stainless steels have proved adequate in groundwood applications. However, the 300 chromi-

TABLE III —

Process or Manufacturing Equipment	Media	PH	Temp. °F
Grinder pit in line of flow—(subject to splashing)	Grinder pulp stock—before addition of zinc hydrosulphite Pulp concentration—5 to 6%		170
Grinder pit	Pulp grinder stock—before addition of zinc hydrosulphite Pulp concentration—5 to 6%		170 Avg
Outside grinder dam on grinder pit	Pulp grinder stock—before addition of zinc hydrosulphite Pulp concentration—5 to 6%		170
Duct to exhaust fan—pulp grinders	Vapors from groundwood pulp		91-130
Knotter screen (exit)	Consistency 0.75%		103 Avg.
Ground wood pulp riffler tank	Groundwood pulp	6.5	97
Sump for secondary accepted stock pump	Groundwood pulp		130 Avg.
Filter vat	Slushed groundwood stock contains $Al_2(SO_4)_3$, $Ca(OH)_2$ and dilute wood acids	5.3-6.1	77 (winter) 149 (summer)
Screening—filtrate	Groundwood pulp .05% consistency alum treated	4.6	110
Stock flume to deckers	Groundwood pulp	4.25-4.35	76
Stock flume feeding deckers	Groundwood for newsprint concentration—0.3%		69 Avg.
Groundwood decker	Groundwood decker feed consistency 0.6%	4.4-4.7	69
Decker	Groundwood pulp .125% consistency (seal pit)	4.8	105
Vacuum decker-main seal pit	Groundwood white water—0.01-0.02% consistency	4.6	112 Avg.
Regulator box-transfer from decker chest	Groundwood stock (0.035% alum, 2.8% consistency)	4.4	80
Stock flume feeding washer	Groundwood pulp—2% consistency	4.1	125
Groundwood white water Chest	Groundwood white water. Average total acidity at $CaCO_3$-53.4 ppm	4.2	123-136
White water pond-screen shower pond	Groundwood white water—0.06% consistency		108 Avg.
Groundwood screen shower pond	White water from groundwood deckers-avg. consistency 0.03%	4.5-5.0	130 Avg.
White water pond-groundwood screen shower pond	Groundwood white water 0.06% consistency	5.3 Avg.	108 Avg.

um-nickel series grades are generally preferred for the extra protection they give. At a Canadian groundwood mill, for example, Type 316 stainless is used for all pulp and white water fittings to avoid dirt and eliminate corrosion from pulp. The mill's engineers claim that Type 316 stainless virtually eliminates pipe maintenance.

MECHANICAL PULP

Duration of Test	Aeration	Agitation	Alloy	Avg. Corrosion Rate (IPY)	Max. Pitting In. During Test
136 days	Freely exposed	Yes	Mild Steel	.013	
			304	.0009	.012 Perf.†
			316	<.0001	None Slight†
			430	.002	.014 Perf†
31 days	Good	Continuous flow	Mild Steel	(Corroded Away)	
			304	.0004	.013 .014†
			316	<.0001	None None
28 days	Good	Continuous flow	Mild Steel	.034	.001 None
			304	<.0001	.007 .007†
			316	<.0001	None None
189 days	None	Moderate	Mild Steel	.02	None None
			302**	<.0001	None None
			316	<.0001	None None
			430	<.0001	.005 .010†
61 days		1 ft./sec.	Mild Steel	.0067	None
			430	<.0001	.002
			304	<.0001	None
			317	<.0001	None
42 days	No	Yes	Mild steel	.0035	.010
			304	<.0001	None
			316	.0002	None
159 days	Moderate	2 ft./sec.	Mild Steel	.008	.016
			304	<.0001	.001
			316	<.0001	None
175 days	Moderate	Turbulent	304	<.0001	None
			316	<.0001	None
52 days	Yes	Yes	Mild Steel	.0228	None
			304	<.0001	None
			316	<.0001	None
30 days	Moderate	Free flow	Mild Steel	.046	None None
			304	<.0001	None .015†
			316	<.0001	None None
			317	<.0001	None None
35 days	Moderate	Free rapid flow	Mild Steel	.031	.003 .005†
			304	<.0001	None None
			316	<.0001	<.001 None
35 days		Free rapid flow	Mild Steel	.046	None
			304	<.0001	None
			316	<.0001	None
			430	.0005	Perf.
93 days	Some	Some	Mild Steel	.0074	None
			304	<.0001	None
			316	<.0001	None
52 days	Considerable	Considerable	302**	<.0001	None
			316	<.0001	None
57 days	Slight	Slight	Mild Steel	.0062	.006
			304	<.0001	None
			316	.0001	None
30 days	Yes	Yes	Mild Steel	.0089	None
			304	.0002	None
			316	<.0001	None
			317	<.0001	None
134 days	Fairly high	Moderate	Mild Steel	.021	.003
			304	<.0001	None
			316	<.0001	None
			430	<.0001	<.001
195 days	Some	15 ft./min.	Mild Steel	.009	None None
			302**	<.0001	None None
			316	<.0001	None None
			430	<.0001	None .007†
118 days	Some	12 ft./min.	Mild Steel	.012	None
			302**	.0001	None
			316	.0001	None
141 days	Some	15 ft./min.	Mild Steel	.004	None None
			302**	<.0001	None None
			316	<.0001	None None
			430	<.0001	None .010†

Cold Soda Pulping

Commercial size cold soda pulping installations are a relatively recent development, (about 5 years old), and there has not been ample opportunity to fully compile data on the corrosive effects of process chemicals on materials of construction. It is recognized that stainless steel is used in many of the nineteen present cold soda mills but to what degree it has not been fully ascertained. In general, Types 304 or 304L are considered quite satisfactory.

Several of the mills are using previously installed globe digesters or new continuous soaking units constructed of mild steel plate. On the other hand, one installation is reported to contain a soaked chip retention bin (immediately following a mild steel rotary globe soaker) fabricated of mild steel but lined with stainless steel. From this bin onwards through the process, including screw pressing, refining, screening and washing, all metal surfaces in contact with soaked chips, stock, and process liquors are of stainless steel.

In another instance, a specially-constructed live-bottom atmospheric soak bin is entirely fabricated of stainless steel, including the bottom screws. The bin, constructed to withstand a full head of liquid within, measures approximately 20 feet by 12 feet by 24 feet high, and is situated out-of-doors without benefit of shelter. However, this piece of specialized equipment has only been in operation for less than a year and no data is yet available regarding corrosion. In other mills, screw conveyors and troughs are sometimes constructed of stainless steel.

In cold soda mills where bleaching-in-the-refiner is practiced (e.g. peroxide bleach solution is added to the soaked chips immediately ahead of the primary defibering equipment) it is justifiable to substitute stainless steel wherever stock and liquor come in contact with metal surfaces. However, the stainless steel surfaces should be passivated (at least the welded seams and joints); that is, treated with a mild concentration of nitric acid. This procedure prevents reaction between the steel and the peroxide liquor by interposing an impervious layer of scale between the metal and peroxide. It is believed that the silicate contained in peroxide bleach liquor also helps to build on this scale layer. Aluminum lines carrying pure peroxide liquor

into the chip stream have been used successfully.

The decomposition that occurs to peroxide when it contacts iron is well known. If mild steel is used in equipment ahead of the point-of-peroxide addition to the chip stream, the mill should be especially careful not to permit corrosion products to enter the system. If the chips were to pick up iron flakes and scales from corroded surfaces, the results could be detrimental, not only in terms of increased bleach consumption, but also in respect to somewhat violent reactions in a confined space. From this point of view it may be economically justifiable to use stainless steel in all of the equipment ahead of the refiners as well as after the peroxide addition.

Neutral Sulphite Pulping

Because of the variations in sulphite-alkali ratio from mill to mill, corrosion can vary from mild to severe in neutral sulphite semi-chemical pulp mills. However, in general, the trend has been to greater severity. One important factor is the relatively high temperature of the neutral sulphite cook. Mills have had success with digester linings of Type 316 stainless steel. One advantage reported is that the stainless steel permits greater chip volume than a brick lining.

Type 304 stainless steel is being used successfully in continuous neutral sulphite digesters. For critical parts of liquor-making equipment, Type 316 has proved invaluable. Several types of stainless steel are also providing good service in pulp washers, disk refiners, pumps, valves, piping, storage tanks and similar equipment.

For recovery, where NSSC waste liquors are frequently corrosive, stainless steel is widely used in evaporators, piping, tanks, and other equipment in the various individual recovery processes. At a southern mill, all four evaporator effects have Type 304 tubes and shells of Type 304L. The same mill originally tried carbon steel for handling white liquor, but found it corroded faster than expected. Now, as each carbon steel unit fails, it is being replaced with a unit of Type 304 stainless.

Waste Paper Pulping

Stainless advantages of long life and low maintenance in waste paper processing equipment help treatment of waste products to remain competitive with virgin pulp. Types 302 and 304 stainless are used in many types

TABLE IV — NEUTRAL SULPHITE

Process or Manufacturing Equipment	Media	PH	Temp. °F
Cook liquor heater (head space)	10-20% Na_2SO_3, 2-4% $NaHCO_3$, 0.01% NaCl, organic solids (batch-type operation)	10.0-8.2	230-275
Vacuum stock washer second stage	NSSC pulp		110
Screw conveyor in discharge from pulp washing	Semi-chemical; neutral sulphite liquor white water	7.2	110
SO_2 absorption tower-exhaust stack-making NS cooking liquor	Water, steam, CO_2, Na_2, SO_3, Na_2CO_3, SO_2, SO_2		212 Avg.
Evaporator—NSSC liquor recovery	Spent neutral sulphite liquor		131-216
Evaporator—NSSC liquor recovery	Sodium base sulphite liquor concentrated	10.5	230 Avg.
Concentrator vapor head NSSC liquor recovery	Alkaline concentrate sodium base sulphite liquor	10.5	230 Avg.

TABLE V —

Bleach liquor headbox	28.5 gpl free Cl_2		81
Bleach heater—horizontal	Bleaching solution—0.5% sodium chlorite, calcium hypochlorite, direct chlorination with H_2SO_4 added	4.5	34.6
Vapor over bleach vats	Hypochlorite fumes		80 Avg.
ClO_2 washer. In headbox	Pulp bleaching solution Kraft pulp stock with residual ClO_2 bleach	6.5	155
First stage bleach washer-washing chlorinated pulp	Bleached sulphite pulp containing residual chlorine		68-78
Chlorinated stock washer	Bleached sulphite pulp consistency 1%	1.5	51 Avg.
Inlet to washer vat—groundwood bleaching	Zinc hydrosulphite bleach	4.2	139
News groundwood washer headbox after zinc hydrosulphite bleach	Groundwood pulp—consistency 1.5-2.5%	3.5-4.0	105 Avg
Chlorine washer seal box	Waste water from chlorination washer—0.035 to 0.07 gpl chlorine		60-90
Seal tank of bleach washer	Hypochlorite solution—0.1 gpl CaOCl, 1.5 gpl $CaCl_2$	7.2	120 Avg.
Wall beside bull screens	Groundwood pulp		150
Headbox to bleach rifflers	Sulphite pulp residual calcium hypochlorite bleach liquor and NaOH	7.0	68 Avg.
Vacuum filter (one end)	Sodium hypochlorite Cl_2 400 ppm	9.2	100 Avg.
White water flume from deckers	Bleached sulphite white water after last washing stage of calcium hypochlorite	6-8	70-80
White water seal box bleach plant	Wash water from sulphite stock	5.0	83.5 Avg.
Knotters screens (inlet box)	Zinc-hydrosulphite	4.5	74

SEMI-CHEMICAL PULPING

Duration of Test	Aeration	Agitation	Alloy	Avg. Corrosion Rate (IPY)	Max. Pitting In. During Test
49 days	None	Turbulent	Mild Steel	.020	None
			304	.0001	None
			316	.0001	None
			410	.0007	None
			430	.0001	None
125 days	Extensive	Extensive	304	.0001	None
			316	.0001	None
82 days	Moderate	Very low	304	<.0001	None
			316	.0001	None
			317	.0001	None
95 days		20 ft./sec.	Mild Steel	(Corroded Away)	
			304	.038	Perf.
			316	.0089	None
56 days	Slight to moderate	1-8 ft./sec.	304	.0001	None
			316	.0001	None
			430	.0001	None
6.8 days	None	Slight	Mild Steel	.021	None
			304	.0001	None
			316	.0001	None
			430	.0001	Deep pits
218 hours	None	Some	Mild Steel	.010	None
			304	.0001	None
			316	.0001	None
			430	.0001	None

BLEACHING OPERATIONS

42 days	Some	Considerably	304	.015	Perf.
			316	.038	Perf.
31 days	About 25% of time	60 ft./min.	Mild Steel	.0087	.002 .002†
			304	.0002	.015 .015†
			316	.0001	.006 .007†
250 days			304	.0001	.022
			316	.0002	.020
14 days	Moderate	4500 gpm	304	.0003	None
			316	.0001	Incipient pitting
			430	.0038	.005
31 days	Moderate	Considerable	304	.0020	.016 Perf.†
			316	.0010	.011 Perf.†
			317	.0004	None .009†
106 days	Extensive	Moderate	Mild Steel	.041	Perf. None
			304	.0001	None .006†
			316	.0001	None None
			310	.0001	None None
209 days	Slight	Moderate	Mild Steel	.014	None
			304	.0001	None
			316	.0001	None
106 days	Extensive	Moderate	Mild Steel	.0030	None
			304	.0001	None
			316	.0001	None
			310	.0001	None
83 days		Mild	304	<.0001	None .003†
			316	<.0001	None <.001†
68 days	Extensive	Extensive	304	<.0003	None .015†
			316	<.0001	None Slight†
			317	.0001	None Slight†
209 days	Little	Slight	Mild Steel	.0085	None
			304	.0001	.007
			316	.0001	None
97 days	Negligible	75 ft./min.	304	<.0001	None
			316	<.0001	None
72 days	Moderate	Fairly high	316	.0016	Under pulp deposit
87 days	Moderate	By flow into flume	Mild Steel	.0051	.002 .001†
			304	<.0001	None .010†
			316	<.0001	None None
			430	.0002	<.001 .013†
140 days	Extensive		304	<.0001	None
			316	<.0001	None
209 days	Moderate	Rapid	Mild Steel	.0066	None
			304	.0001	None
			316	.0001	None

of defibering and de-inking equipment because of their excellent resistance to caustics and strong detergents. Stainless steels are also invaluable in waste paper cleaning systems—rifflers, screens, and centrifugal cleaners.

Bleaching

One of the most corrosive areas in a pulp mill is the bleach plant. Stainless steels have had a good service record in caustic bleaching equipment — washers, thickeners, tanks, piping, mixers, screens and valves. However, chlorine and chlorine containing bleaches present real problems. These highly corrosive solutions can have serious effects on many materials of construction, including stainless steels. Nevertheless, based on comparisons of life versus cost, stainless steels frequently are specified for certain units of chlorine bleaching systems, particularly washers and washer-thickners.

A number of mills have standardized on Type 316 stainless for cylinders and facing on bleach pulp washers, as well as caustic extraction washers. In general, Types 316, 316L and 317 are selected for the most corrosive applications. For the less-corrosive applications, Types 302 and 304 are often adequate. Use of stainless steels in bleach line equipment at a Canadian kraft mill is a good illustration.

In the washer-thickener following the chlorination tower, Type 316 stainless is used in contact with stock and white water. In the washer following caustic extraction, parts in contact with stock and white water are Type 304. The mixer following this washer is also Type 304 stainless. Type 317 stainless is used in the chlorine dioxide mixer for metal parts in contact with the stock before addition of ClO_2. The scraper and spray ring on the ClO_2 tower are also Type 317 for all parts touching stock. The roll on the washer-thickener following this tower is Type 317 stainless as well. In addition, bleached storage agitation system parts, the screens are also stainless steel.

A similar example of this type of material selection is offered by a midwestern soda pulp mill. Chlorine dioxide bleach plant washers and piping are Type 317 stainless. Hypo and chlorination stage washers are type 316L; washers following the sodium hydroxide stage, Type 304L. The finished bleach storage tank is also lined with Type 304L stainless.

Russians Plan New Plants for Manufacture of Paper Machinery

Although current plans for expansion of Soviet pulp and paper capacity are based primarily on imported machines, they are building new plants and standardizing machine sizes to increase their own capabilites in the manufacture of pulp and paper machinery.

F. A. Abadie-Maumert

Considerable progress is predicted in the manufacture of machinery for the Soviet paper industry in the period covered by their current Seven Year Plan (1958-1965). The accompanying table shows the scheduled rate of production increase in this industry. This increase in pulp and paper production will be effected principally by a more efficient utilization of capacity, further improvement in production processes, modernization of plant equipment, building of some 20 new pulp and paper mills, and increasing the capacity of 10 large existing mills. By 1965, investment in the pulp and paper industry is to be increased by 400 per cent over 1958.

According to data of the Soviet State Planning Committee, the country's mills in 1960 had 292 paper machines and 51 board machines in operation. More than half of them are in need of immediate and complete modernization. Mills under construction will also need new machines.

Because of this, the Russians are planning to build two large new plants for the manufacture of paper machines, jordans, winders, supercalenders and all equipment for paper mills, at Ishewsk in the Ural Mountains and at Petrozavodsk in the Soviet Karelia. Two existing factories near Leningrad will be expanded.

Table I.
Planned increase in pulp and paper production from 1958 to 1965. (In 1000 tons)

	Production 1958	Scheduled 1965
Total	2980	7980
PULP		
Viscose pulp	180	580
Paper Pulp	2800	7400
groundwood	840	1800
chemical pulp	1960	5600
PAPER AND BOARD		
Total	2900	7750
Paper	2190	4150
newsprint	390	1060
books	350	630
bag	212	500
wrapping	360	800
toilet	9	165
paraffined	10	80
cable	17	80
greaseproof	25	35
condenser	3	20
Board	810	3600
straw	—	300
corrugated	70	1950

The new machinery plants are already partially constructed, and the Soviets are said at present to be in a position to export certain types of machines for the production of paper and board.

Soviet Objectives

At the paper research center in Novoskaje Dubrowka, in the vicinity of Leningrad, some 300 to 400 million rubles will be invested in the next three or four years. Among other things, three experimental paper machines will be built. The first, a newsprint paper machine, will have a wire width of 66 inches, and a maximum operating speed of 3,000 feet per minute. The second, an offset and coated paper machine, will have a width of 55 inches and an operating speed of 1,500 feet per minute. The third, a sanitary paper machine, will have a width of 66 inches and a speed of 3,000 feet per minute.

A board machine with a wire width of 40 inches and design speed of 1,800 feet per minute is also being planned

Industrially, the Seven Year Plan now in progress prescribes an increase in production at two existing paper machinery plants to a level of 150 million rubles a year. With the addition of the two new plants now being built at Ishewsk and Petrozavodsk, annual production of paper machinery will be valued at 700 million rubles. It is expected that a subsequent level of one billion rubles yearly will be attained

The new plants will specialize in constructing machines of a high technical standard, including paper machines with a width of 265 inches and an operating sped of 2250 f.p.m., and board machines with a width of

250 inches and operating speed of 1800 f.p.m.

The new plant at Petrozavodsk will specialize in the construction of newsprint paper and board machines with standardized widths of 170, 250 and 270 inches. It will have an annual production of twelve paper or board machines plus winders, representing a total value of 320 million rubles. Nine buildings will be used for production, with the machines being assembled on ten independent assembly lines. This plant will be put into use in about 1965, and will therefore play only a small part in the present Seven Year Plan, for which the majority of new machines will be imported.

Standardizing Machine Size

The design and manufacture of machines with non-standard widths requires a longer period of time than for standard machines. The Soviets are consequently making a great effort towards standardization, and according to information obtained from Czechoslovakian sources, optimum dimensions have been set as follows:

For a newsprint paper machine—width of wire 265 inches, operating speed 1950 to 2250 feet per minute, output 90,000 tons per year.

For a printing-writing paper machine—width of wire 170 inches, speed 1500 to 1800 feet per minute, output 40,000 tons per year.

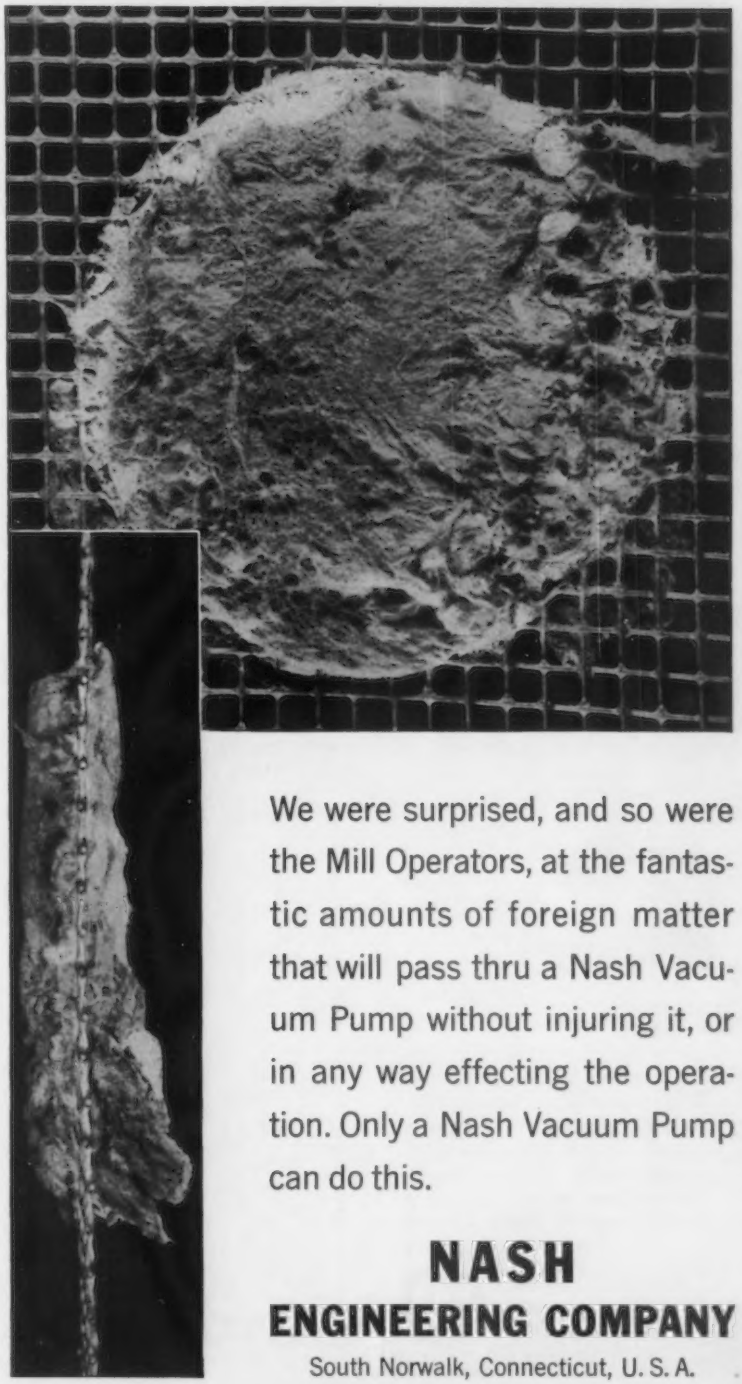
For a board machine—width of wire 170 inches, speed 750 feet per minute, output 60,000 tons per year.

At present the USSR manufactures machines of varying widths, each of these being a multiple of the standard width of different kinds of paper and board. For this reason it is now recommended that paper and board machines produce finished trimmed widths of 64, 80, 100, 170 and 235 inches.

Paper Machines for Export

At present, the Soviets are already in a position to export the following types of machines for the production of paper and board: Model P, designed for the production of cigarette paper and other kinds of tissue paper; model K-04, designed for the production of cable paper from kraft pulp; model KM-II, designed for the production of condenser paper; model M, designed for the production of kraft paper to be used for sack and bag making; model B-03, designed for the production of paper for bag making as well as of wrapping paper; and model K-2, designed for production of roofing board.

We put a screen on the intake of a Nash Paper Mill Vacuum Pump for a few hours...



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PJT NEWS OF CONVERTERS

Wyomissing to Up Laminating Operations

With the completion of new equipment now under construction, Wyomissing Paper Products Co. of Reading, Pa., will make an important expansion in the scope of its laminating operations. The company has just concluded a contract with the Inta-Roto Machine Co. of Richmond, Va., for the construction of machinery which will enable the company to laminate many combinations of paper, cloth, board, film and foils.

Delivery of the machinery, which will be installed in the company's new plant at Tuckerton on the northern perimeter of Reading, is expected by the end of 1961.

Wyomissing, producer of a complete line of coated paper, has included lamination of cloth to paper and paper to paper since the company acquired the United Manufacturing line several years ago. The new equipment will be another major step in the modernization and growth program started three years ago.

Con. Can Names Fiber Drum Plant Managers

D. S. Thompson, manager of manufacturing for fiber drums, has announced two plant managerial appointments within the Folding Carton & Drum Division of Continental Can Co.

D. G. Roggenkemper switches over from Carteret, N. J., plant manager to a similar post in Tonawanda, N.Y. This fills a position left open by the death of Vern B. Dunifon in April.

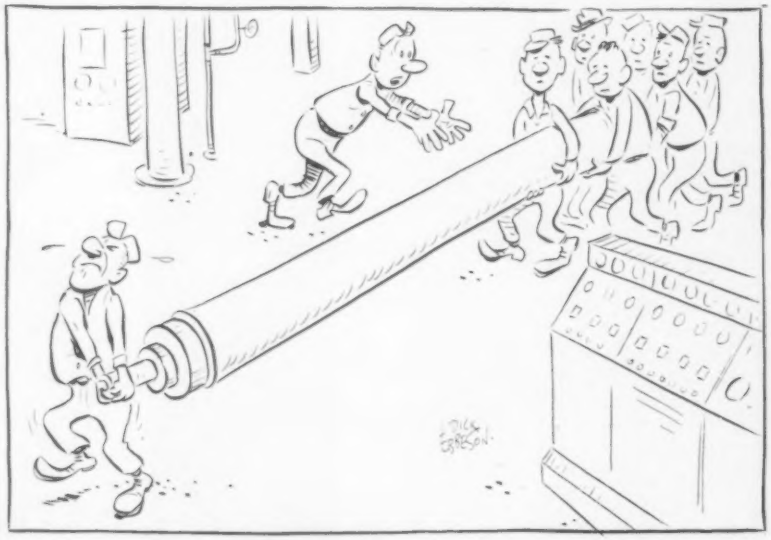
E. P. Sielschott replaces Mr. Roggenkemper as Carteret fiber drum plant manager, having previously been plant industrial engineer in Van Wert, Ohio.

MM&M Appoints Walton Vice President, Research

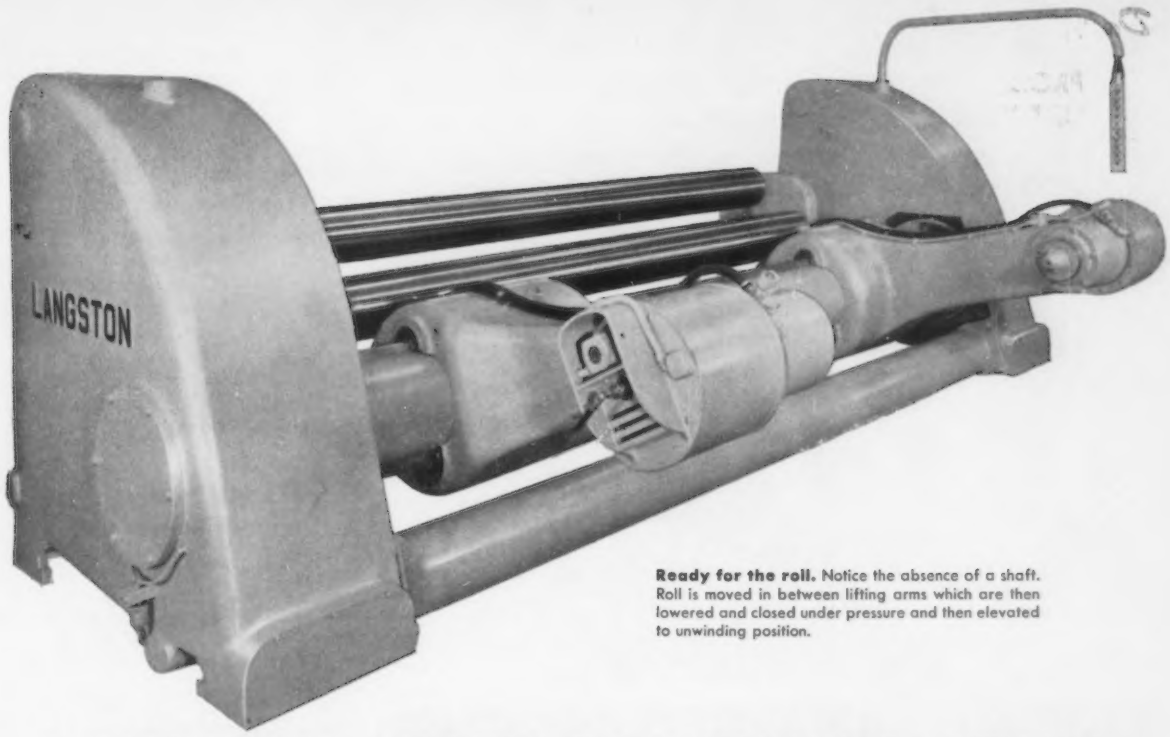
Minnesota Mining & Manufacturing Co., St. Paul, Minn., has appointed Charles W. Walton as vice president for research. He succeeds Carl Barnes who recently resigned from 3M for personal reasons.

Dr. Walton was formerly vice president and general manager of 3M's adhesives, coatings and sealers division. He will be directly responsible for the Central Research Laboratory and the Product Fabrication Laboratory.

Dr. Walton will also be responsible for relating activities of staff laboratories with those of division labora-



"Here—Let me help!"



Ready for the roll. Notice the absence of a shaft. Roll is moved in between lifting arms which are then lowered and closed under pressure and then elevated to unwinding position.

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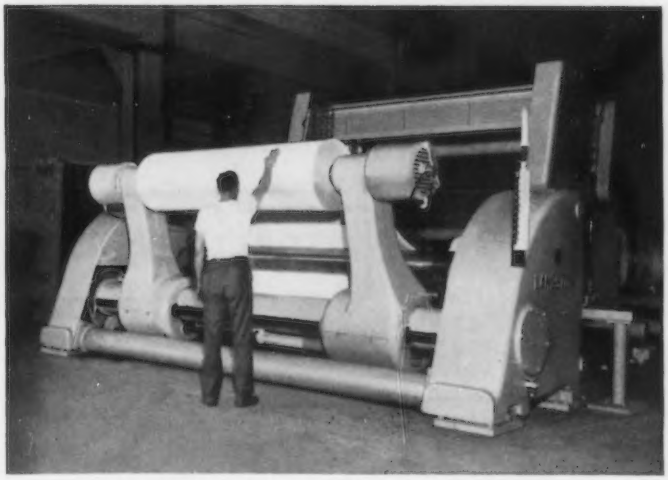

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You not only save time, you also get better unwinding. Roll can be positioned laterally by pushbutton control—even when the machine is running. It's held firmly under pressure for complete safety throughout the unwind. Several braking arrangements can be provided to handle a wide range of grades and conditions. Available extras provide for handling very narrow rolls; for constant tensioning; for automatic braking of idler rolls; for automatic web alignment and side register control; for web oscillation; and for local or remote control.

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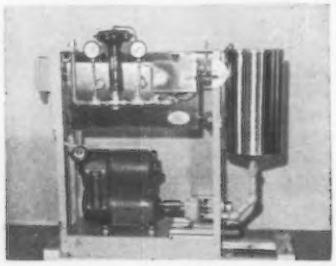

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THREE RANGES—changed with a flick of the switch
FOOL-PROOF READINGS—only the scale in use is visible
COMPACT SIZE—3½"x5⅝"x2½"; fits your toolbox
LIGHTWEIGHT—only 24 oz.
HANDY CASE—carry all accessories with you
VERSATILE—reads directly: shaft speeds in RPM; belt speeds in ft./min. or in./min.
ONE ROTATING PART—ball bearing-mounted; permanently lubricated.
Send today for Bulletin 103A and ordering information. Delivery: one week.

Metron
METRON INSTRUMENT CO.
5306 So. Delaware, Littleton, Colo. PY 8-2537 DDD: 303 TWX: DN 194

tories, each of which is charged with improving its own products and developing new products in closely allied lines.

Murphy Joins Major Paper As Vice President

Major Paper Converters, Inc., announces that Eugene N. Murphy, formerly with the A. G. Nelson Paper Co. of New York, has become vice president in charge of paper converting operations.

Mr. Murphy will be assisted by his son, Francis A. Murphy, who was previously associated with him.

Cook Joins Permacel As Product Manager

Permacel, New Brunswick, N. J., manufacturer of pressure-sensitive tapes and adhesives, has announced the appointment of Robert B. Cook as product manager, Specialty Paper Products.

Mr. Cook was formerly a senior associate at Werner Management Consultants, Inc., and prior to that, sales representative for Eastman Chemical Products, Inc.

Ryan to Represent Frye In New York City Area

Richard Ryan has been appointed Metropolitan area representative for the Frye Manufacturing Co., Newburg, N. Y., producers of one-time carbon papers. The Metropolitan area includes, New York City, all of the boroughs and Long Island.

Mr. Ryan was previously associated with a New Jersey paper merchant for 10 years.

OBITUARIES

Robert J. Askin, executive vice president, Development, Engineering and Services, Abitibi Power & Paper Co., Ltd., Toronto, Ontario, died on July 1.

William Walpole, 70, past president of the New England Newpaper Trade Assn., died July 7 in Faulkner Hospital, Jamaica Plain.

Mr. Walpole, a resident of Winthrop, Mass., served as general manager of the Rutter McNaught Paper Co. of Boston for the past 25 years.

PJT NEWS OF SUPPLIERS

Irving Fischer

C. W. Kyle

Fred Ihlenburg

Harry Ashworth

National Starch and Chemical Corp., New York, N. Y., has appointed Irving Fischer manager of the newly expanded Mid-Atlantic Division. He succeeds Jack Snyder who passed away suddenly on June 14.

Sprout, Waldron & Co., Inc., Muncy, Pa., has announced that C. W. Kyle has joined the company as a sales representative and will represent it in the sale of its pulp and paper equipment, in the states of Ohio, Indiana, Michigan and Kentucky.

Mr. Kyle has served in a similar capacity with Shartle Brothers, Fiberboard Products, Inc., and Bauer Brothers Co. He will work out of Franklin, Ohio.

This addition to the Sprout-Waldron sales staff represents a further expansion by Sprout-Waldron to meet the increasing demands of the pulp and paper industry for its disc refiners.

Air Reduction Chemical & Carbide Co., a division of Air Reduction Co., Inc., has appointed Thomas H. Manninen technical assistant to the president. As an advisor to G. R. Milne, the division's president, Dr. Manninen is responsible for reviewing and evaluating plans for new plants, plant expansions, and plant improvements.

With Airco since 1954, Dr. Manninen was formerly director of chemical research and engineering at the central research laboratories of Air Reduction Co., Inc. From 1936 to 1954, he was associated with the U. S. Industrial Chemicals Division of National Distillers, at the Stamford, Conn., and Baltimore, Md., research laboratories.

Draper Brothers Co. has announced the appointment of Fred Ihlenburg as assistant sales manager in its Papermakers Felt Division at the home office in Canton, Massachusetts.

For the past three and one-half years he has handled service calls on the West Coast, operating out of the office of Walter A. Salmonson, West Coast representative located in Portland, Ore.

Scapa Dryers, Ltd., Blackburn, England, largest manufacturer of paper makers' felts in Europe, has announced appointment of Harry Ashworth to the board of directors. The vacancy on the board arose due to the appointment of A. Green, M.P., who was vice chairman of Scapa Dryers Ltd., as Parliamentary Secretary to the Ministry of Labor.

Mr. Ashworth, the son of Frank Ashworth, well known to the paper industry as the technical director in charge of Scapa's Woollen Division, has had extensive experience in the manufacture of woolen felts. He joined the company in 1935 when Scapa commenced to manufacture woollen felts in addition to its extensive range of dryer felts.

Waterbury Felt Co. has announced plans for a 6,000-square-foot addition to the firm's facilities.

According to R. H. Faire, vice president and general manager, the new building will house a new loom for the production of papermakers' needled felts, a type which has proved superior to conventional felts for the production of certain kinds of paper.

The decision to produce the needled felts came after many months of research in paper mills in the United States and abroad.

SYNTHETIC
Content Felts
Can Help You

NYLON
DACRON
ACRILAN
ORLON
DYNEL

It takes experience and know-how to make the proper synthetic content felts for individual machine applications. At Albany Felt our *careful blending* of the *right synthetics* and wools provides felts that give uniformly good performance. As proof, about 60% of the felts we now supply have synthetic content and give these benefits. . .

Longer Felt Life
Greater Drainage
Less Down Time

Perhaps there is a position in your mill where a specially designed synthetic content Albany felt will improve your production.

TALK IT OVER WITH YOUR ALBANY FELT SALES ENGINEER

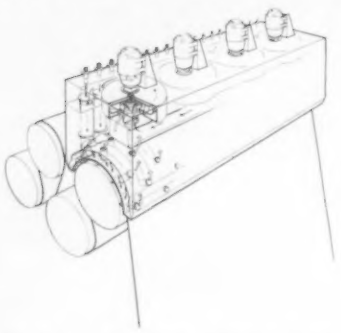
AVAILABLE — UPON REQUEST

"Improved Felt Performance" handbook. Ask for your free copy from your Albany Felt Sales Engineer.

AF ALBANY FELT COMPANY
ALBANY, N. Y.
Dedicated to Paper Industry Progress

SF NEWSLETTER

COMPACT, CONVENIENT . . . SF'S NEW C-TYPE DRYER



The SF Air Dryer, Type C,* is a breakthrough in dryer design. Internal air circulation permits low fan power expenditure, with a minimum of external ductwork. The C-dryer can be installed on old or new paper machines.

Built-in centrifugal fans produce a high velocity air impingement on the sheet. While recirculating most of the drying air, the preheated make-up is introduced to the fan inlets through dampered orifices.

By changing the ratio between hot make-up and recirculating air, the drying air temperature can be varied, thus providing a series of temperature zones, usually four, across the width of the machine. This system is further divided into 15 inch wide sections, each with an individually operated damper to provide controlled impingement across the sheet.

Top versatility for controlling sheet moisture profile is assured by this unique temperature zoning for micro-leveling coupled with the controlled impingement for micro-adjustment.

Other features of this versatile new dryer deserve your attention. May we hear from you?

*Patented, U.S. & Foreign

★ AMERICAN SF PRODUCTS, INC.
701 Palisade Avenue
Englewood Cliffs, N. J.
•
SF Products Canada Ltd.,
940 Cote de Liesse Road, Montreal

Prices of Fibers

MARKET WOOD PULP

THIRD QUARTER CONTRACT PRICES PER SHORT AIR-DRY TON

Delivered Basis

	U.S.	Canadian	Swedish	Finnish	Norwegian
Groundwood	$82.50/ 90.00	$82.50/ 90.00	$90.00/ —	$90.00/ —	$90.00/ —
Bleached Gw'd.	97.50/100.00	97.50/100.00			
Kraft, Blchd.	$140.00/150.00	$140.00/150.00	150.00/ —	150.00/ —	150.00/ —
Kraft, Blchd. Hdwd.	135.00/140.00		140.00/ —		
Kraft, Semi-bleached.	130.00/140.00				
Kraft, Unbl.	117.50/125.00	125.00/ —	125.00/130.00	125.00/ —	
Sulphite, Blchd.	$135.00/140.00	$135.00/140.00	140.00/ —	140.00/ —	140.00/ —
Sulphite, Bl. Hdwd.	135.00/ —				
Sulphite, Unblchd.	125.00/ —	125.00/ —	125.00/ —	125.00/ —	125.00/ —
Sulphite, Unb'l. Gl'sn.		140.00/ —	134.00/ —		
Soda, Blchd.	130.00/135.00	130.00/135.00			

‡ Depending on Brightness.

COTTON LINTERS

F.O.B. OIL MILLS PER CWT
WEEK ENDED JULY 18

	Atlanta	Memphis	Dallas	Los Angeles
Grade 1	n.a.	n.a.	n.a.	n.a.
2	n.a.	n.a.	n.a.	$7.00/ —
3	$7.00/6.50	$7.50/7.25	$7.50/7.00	6.75/6.50
4	6.50/5.75	6.50/6.25	6.50/6.25	6.00/5.75
5	5.75/5.25	6.00/5.75	6.00/5.50	5.25/4.75
6	5.25/4.50	5.50/5.25	5.25/5.00	4.50/4.00
7	4.50/4.00	4.75/4.50	4.75/4.00	n.a.

WASTE PAPER MARKET

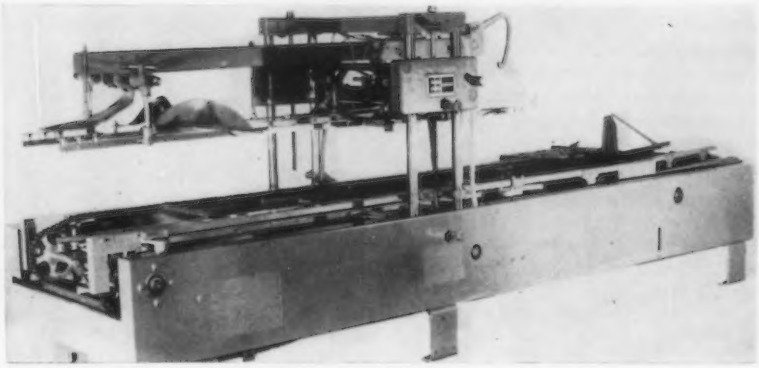
Mill Prices, f.o.b. Trucks Shipping Point — Includes Brokerage

These quotations are a partial indication of the price range on volume tonnage in each market on the date specified, as gathered from major dealers and brokers. SPECIAL PACKINGS AND SPOT TONNAGE NOT INCLUDED. Prices nominal.

	New York	Boston	Chicago	Los Angeles
	July 24	July 24	July	July
No. 1 Mixed Paper	$ 7.00/ 9.00	4.00/ 7.00	6.00/ —	12.00/ —
No. 1 News	12.00/ 13.00	11.00/ —	11.00/ —	16.00/ —
Overissue News (Lg. size)	9.00/ 11.00	9.00/ 11.00	16.00/ —	18.00/ —
Mill Wrappers	19.00/ 22.00	7.00/ 9.00	9.00/ —	13.00/ —
Old Corrugated Containers	17.00/ 18.00	18.00/ 18.50	18.00/ —	16.00/ —
Super Resorted Kraft Paper	35.00/ 40.00	— / —	28.00/ —	50.00/ —
New Double Kr. Ld. Corr. Cuts	27.50/ 30.00	30.00/ 32.50	30.00/ —	27.50/ —
(Semi-chem. medium)	45.00/ —	40.00/ 45.00	42.50/ —	— / —
New 100% Kraft Corr. Cuts	40.00/ 42.50	— / —	52.50/ —	— / —
New Br. Kraft, Env. Cuts	65.00/ 70.00	65.00/ 70.00	47.50/ —	45.00/ —
New Br. Kr. Bag Waste Prntd.	50.00/ 55.00	50.00/ 60.00	47.50/ —	37.00/ —
New Br. Kr. Bag Waste Unprintd.	55.00/ 60.00	60.00/ 65.00	55.00/ —	45.00/ —
No. 1 Groundwood Shvs.	25.00/ 30.00	20.00/ 25.00	10.00/ —	27.50/ 30.00
White Newsblanks	42.50/ 45.00	35.00/ 40.00	30.00/ —	55.00/ —
No. 1 Soft White Shvs.	55.00/ 60.00	55.00/ 60.00	50.00/ —	75.00/ —
Super Soft White Shvs.	65.00/ 75.00	70.00/ 80.00	60.00/ —	— / —
Hd. White Shvs.	75.00/ 80.00	80.00/ 90.00	75.00/ —	80.00/ —
Hd. White Env. Cuts	90.00/ 95.00	100.00/105.00	80.00/ —	103.00/ —
Col. Tab. Cards	40.00/ 42.50	40.00/ 42.50	40.00/ —	35.00/ —
Manila Tab. Cards	57.50/ 60.00	55.00/ 60.00	60.00/ —	65.00/ —
No. 1 Col. Ledger	32.50/ 35.00	30.00/ 35.00	35.00/ —	18.00/ —
White Ledger	45.00/ 50.00	47.00/52.00	45.00/ —	40.00/ —
Mixed Book & Mag.†	— / —	— / —	8.00/ —	— / —
No. 1 Books‡	15.00/ 17.50	18.00/ 22.00	22.50/ —	8.00/ —

† Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% of groundwood.

NEW EQUIPMENT & SUPPLIES



Less Glue, Neater Cases, Cleaner Describe Case Sealer

Lower glue consumption, neater cases and simplified plant housekeeping are among the advantages cited for a case gluer introduced by Emhart Manufacturing Co.

Glue is applied in uniform stripes instead of solid coatings. Tests in production line operations show that the stripes not only set faster than coatings but offer equal or higher sealing strength.

A case-controlled skipgap pattern of application prevents glue from dropping through the slots onto the product. The unit does not spatter glue and so keeps the area under and around the gluer much cleaner.

Eliminated are such accessories as glue pots and rollers and the need to clean and replace them. With the unit, which is designated the Type SK-455, glue is fed from a reservoir under low pressure through hoses and applicators directly onto case flaps. Glue is exposed to the air only at the moment it is applied. When the unit is not in use, the applicators rest on moist pads which prevent glue from hardening on or inside them. The unit is thus ready to operate without make-ready or set-up time.

Other features are: width and length of glue pattern are pre-set and then remain constant; electrical overload protection is used instead of shear pins, permitting the machine to be re-started after overloading by simply pushing a button—the unit is automatically timed. If a case flap is in gluing position and the machine stops for any reason, the applicator heads automatically move away from the flap, cutting off the flow of adhesive. Emhart Mfg. Co., Portland Division, Portland, Conn.

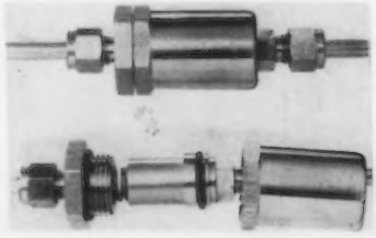
Inline Filter Has Removable Element

Nuclear Products Co. announces an inline filter whose design permits the removal and replacement of the filter element without removing the filter housing from the system. This method of changing elements is said to reduce excessive down time when elements need replacement.

Nupro filters are provided with type 316 sintered stainless steel elements to prevent flaking, thereby eliminating the danger of downstream contamination. Various micron size elements to meet specific needs can be supplied.

Nupro filters are available in brass and type 316 stainless steel with buna "N" or vitron "A" O-rings and rubber gaskets, and Swagelok tube fitting connections.

The large filtering area, in this design, is claimed to minimize pressure drop and increases element life. Nupro filters are for use on instrument air, fluid control systems, coolant systems for machinery and electronic equipment and other applications where fluid system contamination cannot be tolerated. Nuclear Products Co., 15635 Saranac Road, Cleveland 10, Ohio.



Storage Tanks Made of Epoxy Bonded Glass Fibers

Poxyglas, an epoxy-resin bonded, glass filament wound corrosion-resistant tank for use in the storage, transportation and distribution of corrosive materials, has been introduced by Black, Sivalls & Bryson, Inc. Poxyglas products are light in weight and have high strength properties. They are immediately available in sizes up to 12 feet in diameter—limited only by transportation restrictions.

Poxyglas is produced by a patented process of combining glass-fiber rovings and thermo-setting epoxy resins in a precision winding pattern. The strong glass filaments (0.000368-inch diameter) are wound on a steel mandrel. After the desired wall thickness is reached during the winding operation.

Poxyglas is heat-cured while still on the mandrel. The heat transforms the liquid epoxy into a solid bond between the glass filaments and the resin. Structures of continuous filament wound glass fiber construction are claimed to exhibit strengths three to four times those of conventional reinforced plastic.

The shell and head are wound as an integral structure. The shell wall is 0.125-inch thick. Bottoms are molded by a filament-wound mat process incorporating a special flange construction for attachment to the shell.

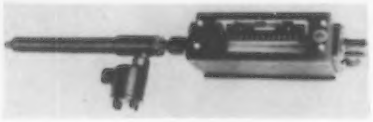
Filament wound Poxyglas does not have "creep" or "wicking action" properties sometimes found in molded plastic products it is said. A major difference, aside from the manufacturing method, is found in the fact that Poxyglas is composed mostly of glass fibers (70 per cent)

as opposed to the usually large percentage of plastic normally found in plastic products. The vessels are designed to operate at atmospheric pressure—and will stand up to an operating temperature of 250° F. Black, Sivalls & Bryson, Inc., Product Information Dept., 7500 East 12th Street, Kansas City 26, Mo.

PORTABLE PNEUMATIC UNLOADER is designed for use with Airslide cars handling starch, and similar materials. This unit in addition to being portable is also designed with hydraulic positioning controls that simplify and speed up unloading preparations. For further information, contact Publicity Dept., Sprout-Waldron & Co., Inc., Muncy, Pa.

Solid State Electric Rotameter Transmitters

Schutte and Koerting has just announced a line of solid state electric Rotameter Transmitters that are



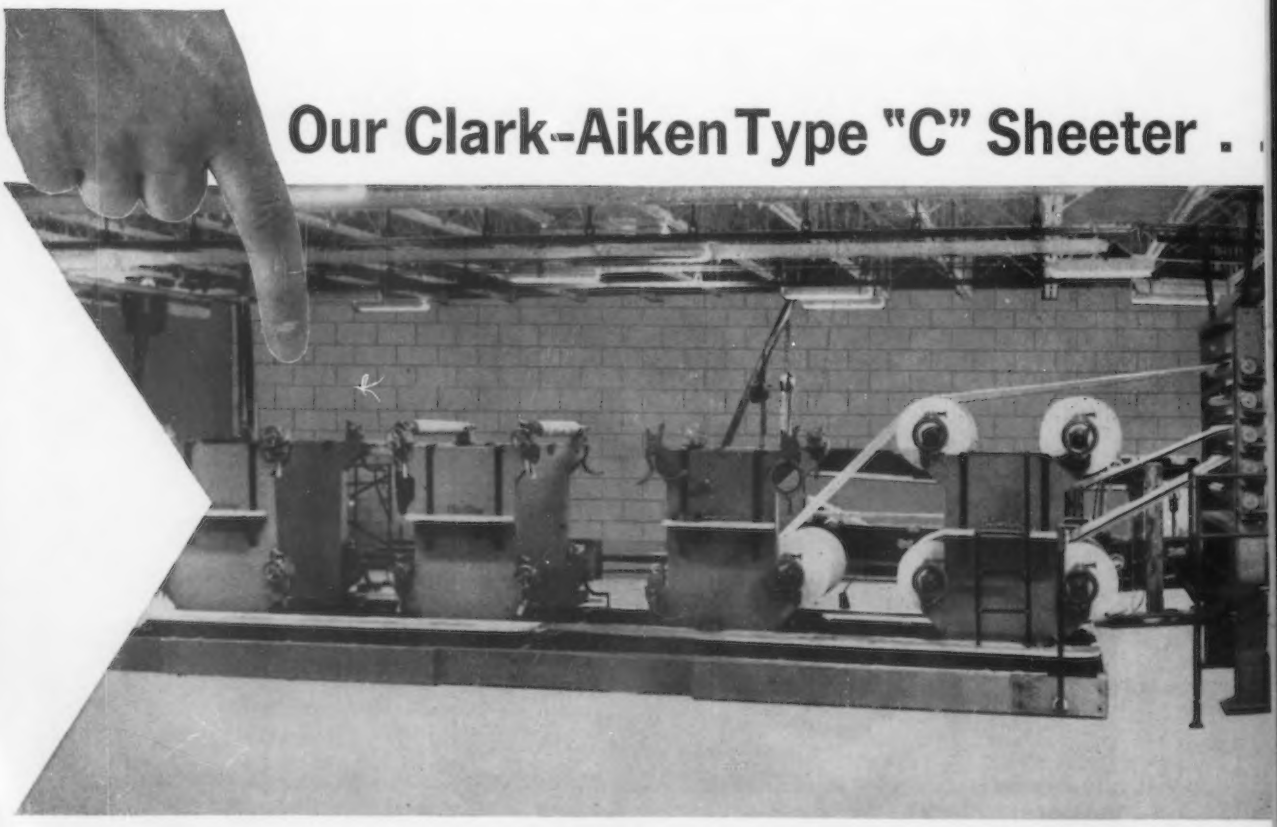
available with any of five D.C. output signals to match the requirements of most existing electric receivers or computers.

The transmitters, which operate on an induction principle, are completely contained in a metal housing that is directly coupled to the company's "Safeguard" or metal tube Rotameters. The Rotameter transmitter is therefore capable of measuring and transmitting flow rates up to 200 g.p.m. in pipelines up to 3 in., at pressures up to 600 p.s.i.g. Dept. *MA-4*, Schutte and Koerting Co., Cornwells Heights, Pa.

Surfactant Line Is Low Foaming

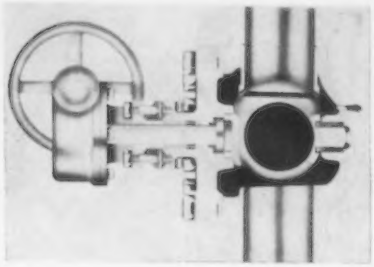
A series of low-foaming nonionic surfactants is now available in commercial quantities from Jefferson Chemical Co. Identified as Surfonic LF-5, Surfonic LF-6, and Surfonic LF-7, these are aliphatic alcohol-ethylene oxide adducts which have been modified by termination with a hydrophobic group to reduce foaming. Foaming action is decreased markedly within the series, going from moderate foam for Surfonic LF-5 to essentially no foam for Surfonic LF-7.

Supplied as a clear, pale yellow liquid, individual selection of the proper member of the series will depend upon their specific application in use. Data released by the company indicates that Surfonic LF-5 exhibits somewhat better surface properties than the other members. Jefferson Chemical Co., Inc., Houston, Texas.



Ball Valve Has Non-Scoring Metal-to-Metal Seals

A ball valve with two major improvements is now in production at General Kinetics Corp.



In the Ludeman Rotoflo valve, the eccentric cam action of the stem lifts the ball away from the seat before it is turned, eliminating the sliding friction that wears and scores the seats. It also permits the use of hard metal-to-metal seating surfaces which assure tight shut-off and permit the valve to be used at high temperature.

Other design features include a full-round flow passage equal to 100 per cent of the pipe area, fast opening and closing, and a locking action that insures tight shut-off, even when line pressure is reversed.

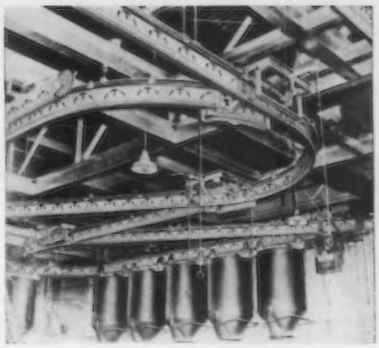
Ludeman Rotoflo valves are available in a wide range of sizes and pressure classes with manual, pneumatic, electric, or hydraulic operators. Contact: General Kinetics Corp., 197 South Van Brunt Street, Englewood, N. J.

Overhead Tramrail Withstands Swinging, Jerky Loads

The Cleveland Crane & Engineering Co., Wickliffe, Ohio, announces the introduction of Tarca Track, a heavy-duty track for overhead materials handling service. The track is a compound section consisting of a steel flange and web, and an especially rolled high carbon alloy steel rail. These parts are welded continuously from end to end to form a combined section free of stress concentrations.

The rail has a hard, flat, raised tread or running surface. This tread is smooth and becomes highly polished in service, assuring continued easy operation of cranes, carriers and trolleys. The hard, raised-tread surface prevents the rail flanges from peening down, due to continuous rolling action of the wheels.

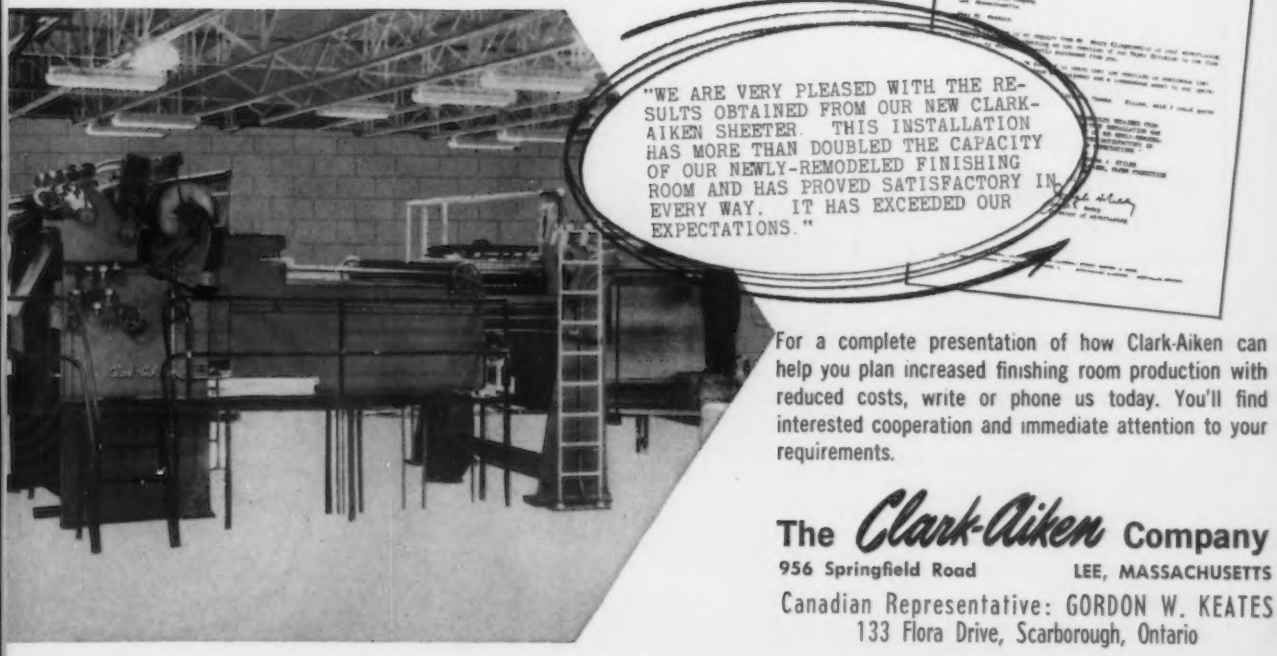
Tarca Track is fabricated in a



large number of standard sizes ranging from eight to twenty inches deep. Special sizes and greater depth tracks can be made. Tarca Track rail dimensions match with existing Cleveland Tramrail track dimensions, permitting extension of all systems now in service. For most situations with long distances between track supports, the track reduces or eliminates the need of an especially engineered structural framework.

Tarca Tracks are uniformly straight and true with all dimensions accurately held. They are not subject to usual mill-beam tolerances and distortions, because such beams

."Has exceeded all expectations," says . . .


BROWN COMPANY
"WE ARE VERY PLEASED WITH THE RESULTS OBTAINED FROM OUR NEW CLARK-AIKEN SHEETER. THIS INSTALLATION HAS MORE THAN DOUBLED THE CAPACITY OF OUR NEWLY-REMODELED FINISHING ROOM AND HAS PROVED SATISFACTORY IN EVERY WAY. IT HAS EXCEEDED OUR EXPECTATIONS."

For a complete presentation of how Clark-Aiken can help you plan increased finishing room production with reduced costs, write or phone us today. You'll find interested cooperation and immediate attention to your requirements.

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956 Springfield Road LEE, MASSACHUSETTS
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133 Flora Drive, Scarborough, Ontario

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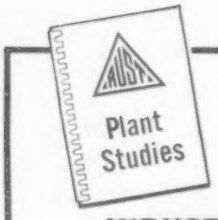
ESTIMATES AND SURVEYS



INDUSTRIAL PLANNING
THE RUST ENGINEERING CO.
PITTSBURGH • BIRMINGHAM

PAPER TRADE JOURNAL is always mailed on Friday and should be received in most parts of the country early in the week. If there seems to be undue delay in receiving your copy, we suggest that you write your local postmaster, with a copy to the postmaster at East Stroudsburg, Pa., where we mail, and a copy to us.

are not used in whole or in part for their construction. Therefore, erection is said to be faster and greatly simplified. Standard deflection will not exceed 1/450th of the span. For applications with spans of approximately 50 to 60 feet between supports, a ratio of 1/600th is normally used. For longer spans, a proportionally higher ratio is used.

The method of supporting Tarca Tracks uses a ball and socket swivel connection both at the ceiling or superstructure and again on the top flange of the track The flexible suspension is said to help equalize wheel loads, eliminates bending stresses in the suspension fittings, and of major significance, promotes free rolling of all wheels.

Tarca Tracks can be used for either hand-power or electrified installations and may be connected to track switches. Systems can be developed for nearly every handling situation requiring straight or curved tracks for all loads up to 20 tons. Standard Tarca Tracks are available in lengths to 60 feet. Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, Ohio.

Figures of the Week

PAPER PRODUCTION RATIO REPORT—American Paper & Pulp Assn. Figures
(Production as per cent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

	June 17	June 24	July 1	July 8	July 15
1961	89.5r	93.4	90.7r	54.8r	83.0
	June 18	June 25	July 2	July 9	July 16
1960	100.0	97.1	88.3	58.3	83.6

r Revised.

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1960	96.5	97.7	98.1	96.9	97.6	96.1	81.2	91.7	89.1	94.8	92.0	80.2	92.7
1961	87.9	90.0	91.2	91.2	91.6	91.4‡							

‡ Preliminary.

COMPARATIVE YEARLY SUMMARIES

	1954	1955	1956	1957	1958	1959	1960	1961
Year to Date	91.4	95.6	99.3	92.3	85.8	91.2	95.2	89.6
Year Average	91.6	96.2	97.9	90.4	87.0	92.2	92.7	

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available.

PAPERBOARD OPERATING RATIOS†—National Paperboard Assn. Figures

COMPARATIVE WEEKLY SUMMARIES

	June 17	June 24	July 1	July 8	July 15
1961	92	95	95	55	73
	June 18	June 25	July 2	July 9	July 16
1960	93	94	90	50	75

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1960	92	95	94	93	94	92	78	94	88	93	86	73	89
1961	88	89	91	91	91	94							

† *Per cents of operation based on "inch-hours" reported on a 6-day basis to the National Paperboard Association.*

SUMMARY OF PAPERBOARD STATISTICS—National Paperboard Assn. Figures

ITEM	WEEK ENDING July 8, 1961	WEEK ENDING July 15, 1961	CUMULATIVE TO DATE Jan. 1, 1961 to July 15, 1961
% Activity	55%	73%	89%
Total	202,725	245,221	8,578,242
Containerboard—Domestic Use	109,799	125,023	4,342,224
Liner	71,398	80,370	2,893,536
Corrugating Material	34,758	40,719	1,316,897
Chip & Filler Board	3,643	3,934	131,791
Boxboard—Domestic Use	52,387	68,160	2,646,494
Folding	28,319	38,922	1,573,648
Set-Up	4,625	5,533	251,603
Special Food Board	19,443	23,705	821,243
Other Paperboard	40,539	52,038	1,589,524
Containerboard Type	18,172	30,186	759,086
Boxboard Type	22,367	21,852	830,438
Total Orders			
Received	228,454	274,741	
Unfilled End of Week	449,261	478,595	

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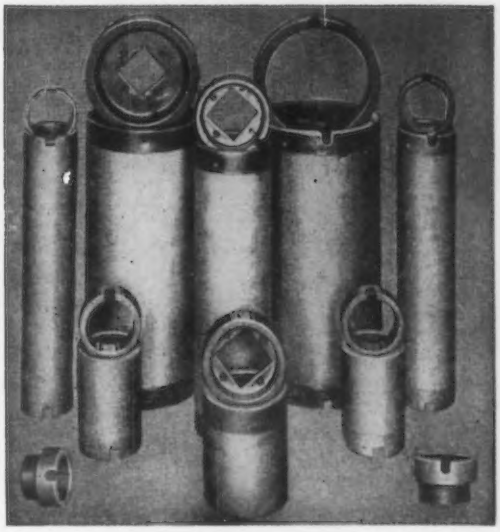

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1—5 roll 86″ face.

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1—96″ Murray 4 knife Chipper—anti-friction bearings.
1—84″ 10 knife Carthage Chipper. Anti-friction bearings, with motor.

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1—27″ High Solid Coater.
1—42″ Chapman Extrusion Type Coater.

CRUSHER & HAMMERMILL

1—Murray Chip Crusher.
1—Williams Hammermill.
1—Jeffrey Shredder.

CYLINDER MOLDS

5—36″ diameter x 75″ face, with couch rolls.
1—36″ diameter x 82″ face.
1—42″ diameter x 96″ face.
2—42″ diameter x 106″ face.
2—60″ diameter x 170″ face.

DRIVES

1—Jones 21 H.P., ratio 10 to 1 (enclosed angle drive).
1—#4 Reeves Drive.
2—Falk Drives, 20 H.P. & 160 H.P.
4—Falk Chest Agitator Drives, 10 H.P. ratio 140 to 1.

DRYERS

1—16″ diameter x 54″ face (steel).
1—28″ diameter x 84″ face.
1—28″ diameter x 48″ face.
4—28″ diameter x 40″ face.
2—Calender Dryers, bronze, 30″ x 128″ with frames, gears & necessary rolls to make up the unit.
1—36″ diameter x 44″ face.
4—36″ diameter x 76″ face.
23—36″ diameter x 84″ face.
14—48″ diameter x 48″ face with bearings.
2—48″ dia. x 52″ face with frames, gears, bearings.
2—48″ x 60″ face, frames, gears & bearings.
1—48″ diameter x 108″ face.
6—48″ diameter x 130″ face.
1—60″ diameter x 92″ face, anti-friction bearings.

EMBOSSING CALENDERS

1—43″ 3-roll Embossing Calender.
1—48″ 2-roll Meadows Embossing Calender.
1—51½″ 3-roll Smoothing Calender.
1—57″ 3-roll Embossing Calender.
1—62″ 2-roll Embosser.
1—90″ 2-roll Smoothing Calender.

FILTERS

1—Oliver, 10 ft. face x 5½ ft. diameter.
1—Oliver, 8 ft. x 12 ft., rubber lined complete.
1—Oliver Filter, 8 ft. x 8 ft.
1—Dorr-Oliver Filter, 3 ft. dia. x 6 ft. face, stainless steel construction, with pump.

FLAT SCREENS

1—12 Plate "Packer".
4—14 Plate IMPCO, bronze vats.

JORDANS

2—#1 Jones High Speed Jordans, Stainless steel tackle, A-F. Bearings, motors.
1—#1 Jones High Speed Jordan.
1—Jones Standard, new spare tackle, with 75 h.p. motor.
1—Noble & Wood Mammoth Jr., with spare plug.
1—Noble & Wood Baby Jordan, anti-friction bearings, with 20 h.p. motor.
1—#6 Miami, anti-friction bearings.

KNIFE GRINDER

1—70″ Seybold.

LABORATORY EQUIPMENT

1—Washer for 5 lb. Beater.
1—24″ Saveall, stainless steel.
1—20″ Fourdrinier Wet End & Press Section.
1—Noble & Wood Cycle Beater with motor & stand.
1—Williams Freeness Tester.
1—Cady Micrometer.
7—Mullen Testers, motorized & hand operated.
1—2 qt. Auto Clave. Stainless Steel.
2—Elmendorf Tear Testers.
1—27″ High Solid Coater.
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2—Emerson, Jr., No. 1 Jordans, anti-friction bearings.
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1—8″ x 8″ Elmes Hydraulic Press.
1—10″ x 12″ Valley Iron Works Flat Screen with drive & motor.

MISCELLANEOUS

1—Shartle Hydrafuge, 1000 g.p.m. (with motor).

MOTORS

4—25 h.p. Westinghouse, totally enclosed, ball bearing. 705 r.p.m.

PACKAGING MACHINERY

1—Lynch Morpac Packaging Machine.

PRESSAFINER

1—7″ Pressafiner, stainless steel construction, New 1955, with new spare motor.

PRESS ROLLS

2—Chilled iron, chrome plated 9″ x 72″.
1—Chilled iron, chrome plated 10″ x 74″.

PUMPS

1—Economy Fan Pump 6000 g.p.m., 20′ head, 50 h.p. motor.

REELS

1—72″ Downingtown Reel, 2 bowl.
1—84″ 3 bowl revolving reel.
1—86″ 2 bowl reel.
1—100″ Rice Barton 2 bowl Reel, heavy duty.
1—116″ Downingtown, 2 bowl, anti-friction bearings.
1—123″ 3 bowl Revolving Reel.
1—130″ Pope Reel (Rice Barton).
1—134″ 2 Drum.

REFINERS

1—Rice Barton Dynofiner, details on request.
1—12″ Wiener Refiner, with 200 h.p. motor.
2—36″ Bauer double disc #185E Refiners, each with two 100 h.p. motors.
1—#4 Dilts Hydrafiner, anti-friction bearings.

ROLL HEADER

1—Valley Iron Roll Heading Machine, complete, for paper rolls 100″ long x 42″ diameter.

ROLLS

Felt, Table, Press, Breast, Couch, etc. Various sizes and types. (Bronze, Rubber, Iron, etc.)

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4—#2A Bird Rotary Screens, copper vats.
1—#2A—50 Bird, copper vat.
2—APMEW Rotary Pulp Screens.

SAVEALLS

1—Oliver, 10 ft. face x 15½ ft. diameter.
1—24″ Continuous Saveall, stainless steel.
1—LaMort 48″ diameter x 82″ face cylinder mold.
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1—160″ Moore & White, simplex, complete.

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1—16″ "Swift" Paper Shredder.
2—Taylor Stiles Rag Cutters.

SLITTERS & WINDERS

1—26″ Cameron Type 26-2A, with constant tension & electric eye.
4—42″ Cameron Type 6.
1—42″ Cameron Type 9.
1—42″ Cameron Type 26-2A.
1—42″ Cameron Type 40-2.
2—50″ Cameron Type 6.
1—72″ Cameron Type 46-W.
1—86″ Two Drum Moore & White 50″ diameter rewind.
1—96″ 4 drum Moore & White winder.
1—64″ Waldron, Shear cut.

SLITTING DEVICE

84″ Quick change slitting device shear cut, complete.

SUCTION COUCH SHELL

1—Downingtown suction couch shell only. 127½″ face 26″ diameter.

SUCTION COUCH ROLL

1—Beloit, 36″ diameter x 246″ face, SKF bearings.

SUCTION FELT ROLL

1—Gilbert & Nash 122″ face.

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1—Sandusky 18″ dia. x 138″ face Suction Press Roll.

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1—7 Roll 70″ face.

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1—95″ Seybold Trimmer, Model 15ZJ.

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2—#3 Nash Hytor.
1—#4 Nash Hytor.
1—#7 Nash Hytor, with 75 h.p. synchronous motor.
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2—K-5 Nash.
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1—L-6 Nash.

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1—Hummer Vibrating Screen, Stainless Steel.
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1—84″ IMPCO Wet Machine.

YANKEE DRYERS

1—60″ diameter x 92″ face, anti-friction bearings.
1—12ft. diameter x 181½″ face.

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A-7

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(pulp and paper)

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